Best Safety Practices in nursing care in Neonatal Intensive Therapy

Boas Práticas de segurança nos cuidados de enfermagem em Terapia Intensiva Neonatal

Las Buenas Prácticas de seguridad en los cuidados de enfermería en Terapia Intensiva Neonatal

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ABSTRACT

Objectives: to identify the perception of nursing professionals on human errors in nursing care at a Neonatal Intensive Care Unit and to assess Best Practices strategies proposed by these professionals for patient safety in nursing care. **Methods:** this is a quantitative-qualitative, descriptive study. Setting: Neonatal Intensive Care Unit. Participants: 22 nursing professionals. Data collection was performed through interviews and sent to the thematic analysis. **Results:** human errors in nursing care, such as wasted catheters; errors in the medication process; causes for error in nursing care, with a focus on work overload; Best Practices for patient safety in nursing care, such as professional training and improved working conditions. **Conclusions:** it is of utmost importance to invest in Best Practices strategies for Patient Safety, aimed at consolidating the culture of organizational safety and encouraging an adequate environment to manage errors.

Descriptors: Patient Safety; Intensive Care Units, Neonatal; Nursing; Medical Errors; Safety Management.

RESUMO

Objetivos: identificar a percepção dos profissionais de enfermagem sobre o erro humano nos cuidados de enfermagem na Unidade de Terapia Intensiva Neonatal; analisar as estratégias de Boas Práticas propostas por esses profissionais para a segurança do paciente nos cuidados de enfermagem. **Métodos:** estudo quanti-qualitativo, descritivo. Cenário: Unidade de Terapia Intensiva Neonatal. Participantes: 22 profissionais de enfermagem. Coleta dos dados realizada por meio de entrevistas e submetidos a análise temática. **Resultados:** erro humano nos cuidados de enfermagem, identificando-se perdas de cateteres e erros no processo de medicação; causas para o erro nos cuidados de enfermagem, destacando-se a sobrecarga de trabalho; Boas Práticas para a segurança do paciente nos cuidados de enfermagem, como capacitação profissional e melhorias das condições de trabalho. **Conclusões:** demonstra-se a importância de investir em estratégias de Boas Práticas para a Segurança do Paciente, buscando-se sedimentar a cultura de segurança organizacional e estimular um ambiente propício ao gerenciamento do erro.

Descritores: Segurança do Paciente; Unidades de Terapia Intensiva Neonatal; Enfermagem; Erros Médicos; Gestão de Segurança.

RESUMEN

Objetivos: identificar la percepción de los profesionales de enfermería sobre el error humano en los cuidados de enfermería en la Unidad de Terapia Intensiva Neonatal; analizar las estrategias de Buenas Prácticas propuestas por estos profesionales para la seguridad del paciente en los cuidados de enfermería. **Métodos:** estudio cuantitativo cualitativo, descriptivo. Escenario: Unidad de Terapia Intensiva Neonatal. Participantes: 22 profesionales de enfermería. La recolección de los datos fue realizada por medio de entrevistas y sometidos al análisis temático. **Resultados:** el error humano en los cuidados de enfermería, identificándose pérdidas de catéteres y errores en el proceso de medicación; causas para el error en los cuidados de enfermería, destacándose la sobrecarga de trabajo; Buenas Prácticas para la seguridad del paciente en los cuidados de enfermería, como la capacitación profesional y las mejoras en las condiciones de trabajo. **Conclusiones:** se demuestra la importancia de invertir en estrategias de Buenas Prácticas para la Seguridad del Paciente, buscando sedimentar la cultura de seguridad organizacional y estimular un ambiente propicio para la gestión del error.

Descriptores: Seguridad del Paciente; Unidades de Cuidado Intensivo Neonatal; Enfermería; Errores Médicos; Gestión de la Seguridad.

INTRODUCTION

Patient safety is a fundamental principle. It is considered a global concept and practice to reduce the risk of unnecessary harm associated with health care to an acceptable minimum[1]. The studies on patient safety were boosted after the report "To err is Human: building a safer health system"[2], which presented strategies to be adopted in the US for the reduction of human errors in Health and the improvement of patient safety with the creation of a safer health system. The statistics of medical errors and the disparity between the incidence of error and the public opinion on the matter were highlighted, as well as the need to improve the level of patient safety in health care.

Such report used the definition by Reason[3] on human error, understood as "the failure of a planned activity to achieve its goal (execution failure) or the use of a wrong plan to achieve its goal (planning failure)". When patient safety is not properly implemented, adverse events occur, which can cause an increase in morbidity, mortality, treatment time and care costs[4].

In this sense, the importance of adopting Best Health Care Practices is highlighted, understood as components of Quality Assurance. These components ensure that services are provided within adequate standards and primarily seeking the reduction of risks which are inherent in the provision of health services[5].

The adoption of Best Practices ensures that the needed resources are provided, highlighting qualified, trained and identified human resources, structural and material resources, logistics support, approved and current procedures and instructions. Moreover, it ensures that complaints regarding the provided services are properly assessed and registered, investigating and documenting the causes of quality deviations, and preventing recidivism[5].

Considering that Patient Safety implies the adoption of Best Practices, they are contributing factors to achieve the International Goals spread by the World Health Organization (WHO). They also promote prevention and control actions for adverse events related to health care and encourage the participation of patients in their own care, thus playing an essential role for their safety[1,5].

The Neonatal Intensive Care Unit (NICU) is a place that calls for a massive investment in Best Practices, referring not only the needs and immediate care of newborn babies, mostly preterm births, but also their unstable health condition and dependence on the different existing technologies. It all hinders a more humanized interaction between health professionals and newborns.

The NICU is a hospital unit designed for the care of high-risk newborns, aged between 0 and 28 days, who need highly trained health care professionals, who must be present 24 hours a day. In this unit, the specificity of care and the dependence level of patients are high. These patients are not able to get involved and/or participate in the care provided[6]. Additionally, newborns are more frequently exposed to potentially harmful errors in an NICU because of their physiological immaturity, limited compensatory skills, rapid changes in weight and a small body surface area, as well as the communication barrier between patients and their caregivers[7].

Nursing professionals keep a close contact with their patients and can identify risks more frequently, as well as offer valuable suggestions for improving safety strategies and, consequently, reducing errors. In addition, the NICU is a complex system that needs specific barriers, exceeding dedication, training and surveillance of its employees[7-8].

For nursing professionals, errors may cause several difficulties, given the emotional stress, ethical precepts and legal punishments for those involved. Therefore, it is important to invest in a culture of organizational safety, one that allows non-punitive discussions, the understanding of events and the adoption of preventive measures[7-8]. Error management can be a useful tool for patient safety culture encouraging Best Practices in the NICU.

OBJECTIVES

To identify the perception of nursing professionals on human errors in nursing care at the Neonatal Intensive Care Unit and to assess Best Practices strategies proposed by these professionals for patient safety in nursing care.

METHODS

Ethical aspects

This study was approved by the Research Ethics Committees of the *Escola de Enfermagem Anna Nery*, of the Federal University of Rio de Janeiro (*Universidade Federal do Rio de* Janeiro) and the Federal Hospital of the State Employees (*Hospital Federal dos Servidores do Estado*). Data were collected after participants signed the Informed Consent Form (ICF).

Type of study

This is a qualitative and descriptive study, which uses the conceptual bases by Reason's Human Error Theory[3] and Best Health Care Practices[5].

Research setting

Research setting was the Neonatal Intensive Care Unit from a general, public and federal hospital, which is part of the Brazilian Network of Sentinel Hospitals (*Rede Brasileira de Hospitais Sentinela*) of the National Sanitary Surveillance Agency (ANVISA). The NICU is divided into two sectors: one Intensive Care Unit (ICU), with space for 10 incubators; and one Intermediate Care Nursery (ICN), with space for 20 incubators or cradles, made available according to the needs of newborns. Both sectors are served by the same multiprofessional and health team, which is subdivided into a monthly scale, previously organized.

Data source

The nursing team counted with 52 professionals, 27 of which being nurses and 25 licensed practical nurses. Inclusion criteria were: being a state employee and working at the NICU and in the sector for over six months. The exclusion criterion was being on leave from the NICU during data collection period, for vacation or different reasons.

According to the criteria described 43 components of the nursing team were selected. Nonetheless, the participants were 22 professionals, 11 nurses and 11 licensed practical nurses, who

worked in the day and night shifts. A total of 12 professionals claimed they could not participate in the study due to their work overload. Data collection reached saturation at interview No. 16, thus adding 6 interviews, equivalent to one-third of the sample, which allowed reaching the theoretical saturation point safely[9-10].

The profile of participants was characterized using variables of gender, professional category, age, training and working time in the NICU. All participants received clarifications of the study objectives, aliases to ensure their anonymity and the acronyms Nur. for nurses and LPN for licensed practical nurses, followed by the interview number.

Data collection and organization

Data collection were performed in a reserved room in the NICU, from January to March 2015, through individual interviews, with the aid of a structured script for the characterization of errors. Participants selected the errors by them identified during nursing care in the NICU and answered a semi-structured script with the following questions: How do you see errors in nursing care? Explain a little about the situations of error experienced or observed by you. What factors do you believe can contribute to the error in nursing care in the NICU? How is the error in nursing care in the NICU being avoided? The interviews were conducted by the researcher, lasted approximately 30 minutes, and were recorded with an MP4 recorder and later transcribed.

The structured routing data were analyzed using the EpiInfo software, version 3.5.2™, and results were presented in a complementary way to the first thematic category. Data related to the semi-structured script were analyzed through the Content Analysis methodology[11], comprising the stages of pre-analysis; exploitation of material; treatment of results, inference and interpretation.

Three categories emerged, in which Context Units are the denominations of the categories and the Meaning Units represent the participants' speeches. The categories were analyzed considering the Human Error Theory, whose assumptions point to the study of errors considering the personal approach and the approximation of the system. The first is related to the unsafe acts performed by people, whereas the second considers that human beings fail and that mistakes are expected and considered more as consequence than as cause[3]. In addition, the assumptions of the Best Health Care Practices were used, considering the recommendations to ensure patient safety[5].

RESULTS

Characterization of the participants' profiles

Among the 22 nursing professionals who were interviewed, 50% were nurses and 50% were licensed practical nurses; 100% were women and their age varied from 30 to 55 years old, 64% of them were from 30 to 41. A total of 73% had from 6 to 10 years of experience in the NICU and 96% reported training time greater than 10 years. All licensed practical nurses had technical training in Nursing. However, they were got their positions as licensed practical nurses from the Brazilian Ministry of Health.

Human error in nursing care in neonatal intensive care

The interviewees said that errors are unacceptable and must not be justified:

I don't understand errors. I don't think they can occur, it doesn't make any sense. Sometimes, when I talk about them in class, there's no justification. (Nur.3)

I think errors are unacceptable. Although we may acknowledge it is humanly impossible not to make errors, in any category, at any professional level. We know it is impossible to be completely error-free, but our ultimate goal is no errors are made. (Nur.2)

Errors were identified as mindful actions by the interviewees, according to their speeches:

Errors occur when you fail to do what you should have done. (Nur.22)

We see skin lesions because sensor rotation in the NICU is not performed, and the baby's skin is thin; then, when children are not moved, they suffer from lesions. (LPN.12)

Nonetheless, some interviewees affirmed they had never seen or made any potentially serious errors, which could lead patients to injuries or death:

I don't see that much serious events in here, not regarding this, I only notice alarms that sometimes are not correctly set up. (LPN.15)

Nothing serious, but I see situations in which children are under precaution and professionals are not wearing gloves. It doesn't matter, because we won't use...this type of stuff. (LPN.16)

Among the most common errors in the NICU, there were wasted catheters, probes and drains, errors in the medication process and accidental extubations.

Sometimes, catheters are wasted due to obstruction; the flow is too little to hold the catheter and can obstruct it, it is externalized because it pulls in some way. (Nur.10)

We (professionals) may change the medications of patients because we're always in a hurry. We must dash about, go here and there, and may end up changing the syringes and giving the medication of one patient to another. Luckily, it was not a harmful medication, like dipyrone or bromopride, but it has already happened. (LPN.5)

The wrong programming of infusion pumps, which runs in as many ml/h of parenteral nutrition, medication, venous hydration and blood glucose levels. (LPN.14)

Wrong reading of a label. The solution was given to a newborn who didn't have the needed weight and liver condition to receive that solution, which caused very severe damage. (Nur.2)

A simple accidental extubation, which happens a lot because the fixation is not like that of adults, it is different, looser, stuck only by tape, doesn't have the cuff. It is very different from that of adults. So, this is one of the things that happens many times. (Nur.18)

As for the characterization of errors in nursing care in the NICU, 81.8% of interviewees mentioned wasted catheters, probes and drains; 68.2%, the inadequate use of Personal Protective Equipment (PPE); 63.6%, the inadequate use of equipment alarms; 59.1%, accidental extubations; and 45.5%, the incorrect handling of medication, lack of checking medical and nursing prescriptions, and improper nursing records.

Causes for human error in nursing care in neonatal intensive care

The interviewees reported tiredness and inattention as the main causes for errors in the NICU, related to work overload and their multiple jobs.

> Tiredness, the number of patients, the inadequate amount of people under care, inappropriate material. Sometimes, this is what happens. Everything leads to error, too much leads to error. And there's also inattention, which I include in tiredness. And the lack of commitment of professionals, which is very important, they must be committed; lack of commitment is useless. (Nur.1)

> We have a great workload. Too often, people work in 2 or 3 jobs, leave one shift to go to the next one. I believe tiredness, emotional exhaustion, physical exhaustion, I think that all, in the blink of an eye, cause errors to occur. (Nur.9)

The quantitative of human resources was also related to the occurrence of errors in the NICU:

> Now, we see many children. Care is deficient when there are too many children to serve and too little professionals. Quality of care is compromised. (LPN.6)

> I think the factors are: reduced number of professionals, insufficient staff that we see every day, people being referred to other sectors, people getting permissions to study, new positions and exonerations. There was a significant reduction of personnel. (LPN.8)

The lack of material resources in the NICU and low quality of material resources used were related, by the interviewees, to errors in nursing care:

> Sometimes, the quality of material isn't good, which may lead to a loss of fixation of catheters and bandages, thus externalizing a PICC [Peripheric Insertion Central Catheter], causing an accidental extubation. (Nur.11)

> Several times, a PICC is wasted because of the inadequate, poor quality of material. It is cracking and if you don't see [in a timely manner] that blood flowed, requiring you to wash this PICC, so that it is not wasted, it obstructs, and the only option is to remove it. (LPN.8)

Problems related to leadership in nursing practice were also cited as contributing factors to the occurrence of errors:

> Supervision is one of the greatest attributes of our profession, because we deal with people, people who study, go beyond, go to college, but sometimes they don't realize that having a degree does not free them from playing their roles, in a given hierarchy. When they are working for an institution, and assigned to a level

> below nurse's, leadership crises begin. Sometimes, the matter is the different perspective each nurse has, hospital professionals. We have a lot of difficulty because of this clash of ideas. (Nur.2)

Best Practices for patient safety in nursing care in the Neonatal Intensive Care Unit

The interviewees mentioned strategies related to Best Practices in Health and Patient Safety to prevent errors in nursing care in the NICU. Emphasis was placed on investment in training and professional commitment, and better working conditions:

> Quantitative and qualification; It's no use hiring a lot of people who are not qualified. So, if you are going to hire someone for nursing care, qualify this person; if you are going to put someone in the preparation of trays, qualify him/her. There is a curative commission, so we can call it because we know it works. (Nur.22)

> That's it, continuing education. There's the daily and constant training, because people's professions are constantly in motion. Everyday has novelties. If you do not read, if you do not upgrade, you'll be outdated. You will not keep up with things because there are always new technologies, a new respirator, a new technique, a new jelco to practice with. So, to minimize mistakes, there must be a daily training, an active continuing education. (Nur.20)

> I think this is a factor that would contribute a lot, if those who work inside the NICU had a complete NICU training, because not everyone here has this training. I think this would improve quality, improve care and minimize errors. (Nur.18)

The interviewees highlighted the importance of the quality of material resources to prevent errors in nursing care in the NICU:

> The improvement in care, the decrease in infection, mean fighting for the best material, one that does not break, a syringe that does not arrive cracked, a three-way that does not break at every moment. We waste catheters for nothing here. I think this is what is missing. (LPN.19)

> For example, if it is related with infusion pumps, we try to put them in distanced places, so that you [professionals] are well-aware of diets, of administration of medications. We end up being careful to have a margin of safety. (LPN.6)

Professional commitment and the need for attention regarding care provided were mentioned by the interviewees:

> You need to focus, pay more attention to what you are doing, even though you are very tired, trying to maintain an integral care so that you are seeing what you are doing. (Nur.9)

The round carried out by the nursing team was highlighted as an important strategy to prevent errors, contributing to spread information and facilitate communication among all professionals:

> Long ago, we had nursing rounds. They were great because the attributes you knew about a child I also knew, given that we discussed the exams, results, deficiencies present in this child, etc. Our conversations were light, just like doctors do in their rounds. We did our round. So, we all had a great sequence of information because we also had a diarist nurse, although I was the one to

be normally on call, we had a diarist nurse who played that role. We had a range of information, regardless of the medical record, regardless of the handwriting we couldn't read. (Nur.2)

Communicating complications to the team was cited as a strategy:

I try to fix it. I try to talk to the nurses on duty to make staff pay more attention. Usually, when there is a problem, we sit and talk about it. (LPN.19)

If an error occurred, it must be conveyed, and the responsible person must be trained. All instances must be informed, and the person must be trained. My team is the strictest here, everyone is committed. (Nur.1)

The interviewees mentioned the importance of care focused on patients, creating bonds between professionals and family members, especially the mother figure:

I believe every mother knows their children, if she says: 'today there's a different spot in his/her skin', you must cherish it, because that may be the beginning of something, or it may be nothing. You see several children, but mothers know their children. It's about paying greater attention, looking at each child individually. (LPN.19)

Talking to families, to maintain family members as much informed as possible, is great because they also become a controlling element in this situation. They are the most interested in the situation. (Nur.2)

The last measure recommended by the interviewees was adopting new protocols and abiding by those already existing, in addition to encouraging discussions on Patient Safety:

I believe implementing protocols is helpful. It refers to the nursing team meeting to better establish care protocols, promoting continuing education, always updating employees, improving care protocols [I do not even know if this term is still used within the institution]. *If these aspects are always updated, there'll always be a chance to minimize or reduce errors.* (Nur.17)

More conversations are needed, more discussion regarding safety, procedures... counting with people to help you in some situations, when changing more delicate bandages, performing a suction via tubes, or adjusting the fixation of a tube. (Nur.9)

DISCUSSION

Despite their severity, the results of this study showed that human error is trivialized in the NICU when not directly related to an adverse event, and it is possible to highlight the inadequate use of infusion pump alarms and procedure gloves in the care of newborns under contact isolation precaution.

The use of gloves is recommended for standard precaution, avoiding contact with blood and other potentially contaminated body fluids, and is considered a PPE. It is also recommended for the care of patients under contact isolation precaution, that is, when there is an "infection or colonization by multi-resistant microorganisms, varicella, skin and soft tissue infections with secretions not contained in the bandage, impetigo, disseminated or immunosuppressed herpes zoster, among others"[12].

The proper use of PPE in the hospital environment helps to prevent Healthcare-associated Infections (HAI), which pose a significant threat to health, raise patient care costs, increase hospitalization time, morbidity and mortality rates in the country's health services. Within the NICU, not wearing gloves under contact isolation precaution should be considered a serious error with potential damage, which may cause health problems to newborns[3].

Inappropriate use of infusion pumps and alarms interferes with the medication process, because if the pump programming is performed wrongly, the medication administered may finish before or after that, which is a serious error, mainly because these patients are complex and totally dependent, such as newborns[13].

Alarm fatigue is also pointed out. Although pieces of equipment with safety alarms (sound alarms) are essential to alert professionals to the changes that occur under the clinical conditions of these patients and at the end of medications, and to warn about the malfunction of equipment, the a high number of beeps, concomitant with the high level of noise in the unit, result in a process in which alarms no longer catch the attention of professionals, which can lead to a negative impact on patient safety[14].

A literature review, on the most frequent incidents in the NICU, highlighted the occurrence of errors in the medication process, mainly regarding inadequate dosage (about 38%), non-administration of the prescribed medication or lack of prescription of needed medications, failure in the administration technique and wrong route of administration. In addition, it demonstrated that errors in the medication process are the major cause of adverse events in the NICU. When compared to the frequency of occurrence of the same errors in an adult ICU, the NICU has an incidence eight times higher[15].

Errors in the medication process are related to the third International Goal for Patient Safety: to improve safety in the prescription, use and administration of medications, which may be associated with problems during patient rehabilitation, longer hospitalization and costs for hospital institutions.

The medication process is a complex task and failures can occur at all stages, ranging from prescription to drug administration. Nursing acts in the stages of preparing and administering medications, and must meet the nine rights, which are: right patient, right medicine, right dose, right time, right route, right reason, right documentation, right patient education and right response. Moreover, doubts must be clarified and drugs with the patient's name, bed, name of the drug, route of administration, drip and infusion time must be identified[16].

In addition to errors in the medication process, problems related to mechanical ventilation were observed, such as extubation failures and accidental extubation, most of which occur due to the absence of the cuff in endotracheal tubes for newborns[15].

Regarding vascular catheters in the NICU, the PICC is widely used. Although it is a less invasive procedure when compared to other devices, because it has a fine bore, and the insertion technique is from peripheral vessels, scientific studies showed several complications related to this procedure, such as thrombus formation, bleeding, phlebitis, migration, catheter fracture, extravasation, cardiac or vessel perforation, infection of the

insertion site and blood infection (sepsis). The nursing team must be aware of the needed care to prevent wasting catheters of this type and future complications[17].

The nursing team plays a central role in care, contributing to mitigate the occurrence of errors. Considering the Error Management proposed by the Human Error Theory[3], associated causes must be known, which usually have organizational approaches, because human beings are fallible and errors, expected, even in the best organizations. Errors should be seen as a consequence and not as a cause, thus originated not in the "perversity of human nature" but in the existing systematic factors[3].

Regarding the causes of errors in the NICU, tiredness was the most cited. Interviewees relate it to work overload, inadequate number of professionals, and the multiple jobs of professionals. The lack of adequate material resources also interferes with professional satisfaction, which is a great stressor for those who seek to provide a safe and high-quality care, and a significant risk to the newborns served.

Double burden is quite common in Nursing, and is mostly due to the low salary paid to this professional category. Professionals who work over 40 hours a week and provide care for more than seven patients are exposed to work overload and professional exhaustion, which can deteriorate the foundation for patient safety. These professionals are also susceptible to inattention in the procedure to be performed, which is aggravated in the NICU, given the specificity of care and level of dependence presented by newborns[15].

In the United States, more than half of nurses work less than 40 hours per week, which is associated with excellent patient safety outcomes. Work conditions of more than 60 hours a week, common in the case of multiple jobs, lead professionals to work in crisis mode, trying to perform everything quickly and without the proper attention. This overload leads to stress and fatigue, factors that compromise performance and may result in errors, lack of communication, interpersonal problems, loss of respect, understanding and mutual help[18], as identified in the interviewees' speeches, who also mentioned lack of leadership and hierarchy in the NICU.

The role of organizational leaders has been pointed as a crucial factor in the development of positive environments for professional practice and patient safety. The accessibility, visibility and inclusion of the team in decision-making contribute to an increased professional satisfaction and retention of qualified professionals[19].

It is the right and duty of nurses to play a leader role, according to the Standards of Professional Nursing Practice (*Lei do Exercício Profissional de Enfermagem*)[20]. In addition to developing actions aimed at health care, nurses must make the appropriate decisions to lead the nursing team, considering human and managerial relations. Considering the specificities of the work routines and of sectors such as the NICU is also needed, which demands, from professionals, a closer look at the technical-assistance-administrative activities and patient safety.

As for conflict management, understanding conflicts as natural in all social relations is of utmost importance. When analyzing the nursing team's profile of the NICU, a heterogeneous group is found, with differences of age and professional training, working together for a long time, which favors the occurrence of conflicts. Nurses must be able to identify and manage possible conflicts, observing factors such as accommodation, which consists in concealment of problems; domination, when the stronger part imposes itself before others; and bargain, in which each part yields a little, trying to satisfy all the demands by means of alternative solutions[21].

Communication is a critical part of conflict management and is considered the second International Goal for Patient Safety: to improve communication among health professionals. It is known that hierarchical differences, power and conflicts in the work environment have directly influenced the way in which communication is established, making professional categories act in parallel, to the detriment of teamwork[22].

A heterogeneous group, such as that found in the NICU, can be considered one of the great challenges for effective and safe communication. Investing in an organizational culture based on objectives and strategies with effective communication configurations is thus fundamental. Among the strategies for safe communication, team meetings, mutual understanding of problems and self-correction are suggested. Structured communication protocols to perform procedures and the standardization of information can also be used in specific situations of the care routine[22].

The culture of organizational safety presupposes the concept that human beings make mistakes and the key to prevention is to structure the systems to minimize chances for mistakes to occur, that is, to encourage the creation of barriers and safeguards avoiding faults in the system[3].

In this sense, reflecting on the causes previously discussed, the study participants highlighted strategies that can be implemented in the NICU, which are barriers to identified errors. According to the Swiss cheese model proposed by the Human Error Theory, every organizational system has barriers, whose function is to protect victims from situations of risk by chance. However, these barriers present faults (holes), which, when found, can contribute to the occurrence of damage. Failures in the barriers of organizational defense systems will always exist and are subdivided into active errors and latent conditions[3].

Active errors are made by those who provide care at the end of the system, and can be exemplified by misidentification of patients, mismanagement of medications, lack of prescription checking, and improper use of alarms and PPE. Latent conditions originate from organizational decision making and can remain dormant in the system for years before being combined with active errors and causing accidents. Both active errors and latent conditions are not easily predicted. Nonetheless, knowing them will lead to the adoption of proactive management[3].

In this study, among latent conditions, professional overload, poor quantitative of professionals, the lack and/or low quality of material resources used and problems related to leadership were identified. The related situations interfere in the work activity, contributing to an unsafe environment for patients and professionals.

Once these situations are acknowledged, professionals must seek effective safety management, improving organizational processes, which can be achieved with the adoption of reactive

and proactive measures[3]. Reactive measures make problem-solving possible and, in relation to the NICU, errors identified by the interviewees, the recognition of negligence associated with the punitive culture, and the attempts to remedy possible damages were highlighted.

Proactive measures are adopted to prevent the occurrence of errors, based on a situational diagnosis, by recognizing errors and their causes. In the NICU, reactive measures are related to the Best Practices, considering the mechanisms to identify patients; actions to prevent and control adverse events related to health care; safe administration of medicines; injury prevention mechanisms; and encouragement of patient's participation in the care given[4].

Considering the specificities of the NICU, investing in professional training and counting with the needed material resources, as for quality and quantity, are the strategies pointed out. Safe care in Neonatology consists of assisting patients with a focus on their needs, respecting their individuality and dignity as human beings, respecting their limitations and physiological immaturity. Meanwhile, the environment must be adjusted to their specificities, using appropriate handling techniques and technologies that reduce the harmful effects caused by procedures or hospitalization[23].

A trained and skilled team will be able to identify possible occurrences and their causes, as well as effectively put into practice protocols, norms and institutional routines. In this sense, the National Patient Safety Program (*Programa Nacional de Segurança do Paciente* - PNSP)[24] highlights in Axis 1 the importance of protocols for patient safety, contributing to standardize care provided and minimize errors.

The importance of humanized and safe care is also emphasized, centered on patients and their families. In the NICU, the patient (newborn) is completely dependent on care, and the presence of companion (the mother, in most situations) should be considered a fundamental requirement for patient safety. Mothers have proactive initiatives, such as the ability to observe, offer protection to their children and question professionals, and it is up to the staff to know and understand the needs and feelings of each family member given the situation experienced[25].

Poor communication increases family distress, especially when they do not receive information on the procedures to be performed and their complications[25]. Thus, the importance of effective and safe communication with families is emphasized, offering the needed guidelines related to the hospital environment and to the period after discharge, when families must care for their newborns at home, by themselves.

The improvement of organizational processes in the NICU can be fostered by investing in patient safety discussions, encouraging the culture of organizational safety. It is impossible to eliminate human and technical failures, which does not mean that there are no problems in making mistakes during nursing care, and it is always necessary to seek mechanisms to prevent errors and mitigate adverse events[3].

Study limitations

The study limitations are related to work overload and reduced quantitative of professionals at the NICU, which hampers the performance of interviews.

Contributions to the Nursing field

The study results show that aiming at Best Practices in nursing care at the NICU contributes to the quality of health care and to patient safety. However, all professionals must be engaged in understanding errors to address the identified causes and put into practice strategies that can contribute to the culture of organizational safety.

FINAL CONSIDERATIONS

This study identified errors in nursing care at the NICU and discusses Best Practices strategies for patient safety. Among the errors identified there were wasted catheters, errors in the medication process and accidental extubations, related to the fatigue of professionals, work overload and insufficient quantitative of material and human resources.

The importance of Best Practices strategies is highlighted, aimed at ensuring patient safety, preventing errors and mitigating adverse events. Among strategies, proactive initiatives must be taken, considering professional training, investments in safe communication, and discussions on patient safety by the nursing team. The measures will contribute to build and consolidate the safety culture, thus encouraging an organizational environment conducive to understanding and managing errors.

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