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Factors That Influence Medication Errors: The Perspective of Neonatal Nurses

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Research Article

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ABSTRACT

Background: The objective of this study was to investigate the factors that contribute to the incidence of medication errors, from the viewpoint of neonatal nurses.

Methods: This was a qualitative study that included 14 nurses from a neonatal intensive care unit of a university hospital in Rio de Janeiro, Brazil. Data were collected via semi-structured interviews and analyzed using Bardin content analysis.

Results: The nurses listed factors that were related to prescription and nursing care, which they believed to result in medication error. From their point of view, these factors may affect the safety of newborns, leading to situations that could involve clinical harm and risk of death.

Conclusion: The results reveal the need for more reliable and safe medication systems, which should be developed and implemented using education programs that focus on the general principles of patient safety, and public policies to improve the culture of safety in neonatal units.

INTRODUCTION

The safety of drug therapy is considered the absence of accidental harm that arises from the medication process, and involves the prevention and minimization of this harm ^[1]. Therefore, it is critical that neonatal nurses understand medication errors in their scope of practice. According to The National Coordinating Council for Medication Error Reporting and Prevention, a medication error is any preventable event that may cause or lead to the use of medicinal products in an inappropriate way, which subsequently causes harm to the patient, while the medication is in the control of a healthcare professional or the patient. These events may be related to professional practice, healthcare products, procedures, or systems, and include prescribing, communication regarding and administration of the medication, product labeling, packaging, nomenclature, compounding, dispensing, distribution, preparation, education, monitoring, and use ^[2].

Attention to the preparation and administration of medications in the neonatal intensive care unit (NICU) must be heightened among professional nurses, as the use of multiple drugs in fractionated doses can increase the risk of toxicity, due to newborn's (NB) organ immaturity, and subsequently increase the incidence of harm. When a drug is administered to the NB, several elements can affect its effects, including uneven weight gain, changes in body weight, degree of maturity in the organs that are involved in the drug's metabolism absorption, and distribution of these drugs. Therefore, all of these elements must be taken into account to calculate the therapeutic dose that should be administered to NBs ^[3,4].

To correctly monitor and understand the side effects of each drug, one needs to understand the hemodynamic parameters of NBs, as these patients remain very fragile, and have a greater disposition to changes in their clinical presentation ^[4]. Unfortunately, there are situations that can facilitate errors in the medication system, and these situations do not depend solely on human

factors, as the medication system is comprised of several complex steps and involves various professionals ^[5,6]. Thus, the health professionals who are involved in caring for NBs must enhance their understanding that error-facilitating situations may be present in their work environment. Furthermore, despite the fact that nurses are at the end of the medication system, nurses should not be considered solely responsible for medication errors. Therefore, this study aimed to identify the factors that contribute to the incidence of medication errors, from the viewpoint of neonatal nurses.

METHODS

This study used a qualitative methodology to investigate the challenges that are associated with studying human relations, processes, and phenomena, which cannot be reduced to mathematical variables ^[7,8].

The study was conducted in a NICU of a university hospital that is located in Rio de Janeiro, Brazil. The study participants were 14 duty nurses and residents, who worked during the day in the NICU, prepared and administered medications, and agreed to participate in the study. The exclusion criteria were not interviewed nurses on maternity leave or medical in the period of data collection, day laborers nurses and nursing leadership, because they do not provide direct care to newborns in the neonatal unit.

The data collection was performed using a semi-structured interview, during September 2013 ^[9]. After obtaining the consent of the participants, the interview was recorded in the Music Player 4 (MP4) format, with concomitant transcription. To address the study's objective, the following question was addressed to the nurses: What factors do you think contribute to the incidence of medication errors in the NICU?

Per Resolution 466 / 12 of the National Health Council, the study was approved by the Research Ethics Committee (COEP) of the hospital (protocols COEP n° 359.980 and CONEP n° 399.697). All subjects who agreed to participate in the research were advised that they could withdraw at any time, without any burden or constraint, and that the privacy, anonymity and confidentiality of the information that they provided was guaranteed. To ensure anonymity, subjects chose names of flowers as their personal identifiers. After this process, a Free and Informed Consent was presented to the participants.

After the data collection and transcriptions of the interviews, Bardin content analysis was used to evaluate the data. This strategy facilitates analysis of communications (verbal or other) via systematic and objective description of the content of the messages ^[9].

RESULTS

All 14 study participants were female. With regard to age, 6 nurses (42.86%) were aged between 30 and 45 years, while 5 (35.71%) were between 20 and 29 years and 3 (21.43%) between 50 and 55 years with a mean age of 36.29 years. As for the training time, it found an average of 11.71 years.

Of the 14 participants, 10 were experts (71.43%) 3 (21.43%) had master's and 1 (7.14%) only graduation. To perform the content analysis, the interviews were transcribed, performing exhaustive reading. After this step, the central ideas were separated by color and grouped by similarity, which made possible their coding. In all, 162 were found Registration Units (RUs), which originated common themes. To guarantee the anonymity of participants, flower names were chosen to quote excerpts from the narratives.

Based on the Bardin content analysis, the following analytical categories were revealed:

- (i) factors that were related to the prescription of medication
- (ii) factors that were related to professional duties.

Factors related to the prescription of medication

According to the participants, one of the factors that contributed to the incidence of medication errors was related to drug prescription: [...] *The error can exist at the beginning, from the prescriber [...] the prescription is written to tell you what to prepare [...] and allows us to prepare the medication; unfortunately, if you can't read, we try to prepare it and end up making another mistake [...]* (Orchid). [...] *Sometimes the doctor provides the wrong prescription. Sometimes we can catch this mistake, although we may not notice, and provide the wrong prescription [...]* (Acacia).

Based on these statements, the medication errors may stem from the prescription of the drug, an incorrect calculation, an incorrect route, or even illegible writing.

Factors related to professional duties

In this category, the factors that contributed to medication errors were related to the nurses' professional duties. These included a lack of attention, distraction, work overload, multiple jobs, tiredness, lack of experience/inexperience, and lack of training.

The lack of attention was considered a contributing factor for the incidence of medication errors:[...] *By a lack of attention,*

prescribes wrong dose or wrong route [...] inattention also contributes very much [...] are some of the factors that contribute [...] I think that is very much related to attention [...] (Orchid) [...] Lack of attention as well, in all processes [...] inattention during all of the processes, from what I told you: dispensing, prescription, I think that's it [...] (Lily).

Distraction was also cited as a contributing factor for the incidence of medication errors: [...] *There's a phone where everyone prepares medications that rings all of the time, and everyone comes in at all times. This causes distraction, which may be a factor for the error [...] it removes your attention [...]* (Orchid) [...] *Carelessness may occur when preparing the medication. You can be careless when you're preparing, someone distracts you, says something, and you miss what you are preparing. This contributes to the medication error ... You arrive, you are preparing, here comes something else, do this, do that! You err, you are human. Unfortunately, everyone can make a mistake, whatever your attention [...]* (Violet)

Therefore, for professionals who work in neonatal care, it is obvious that many factors can generate distraction in the NICU. As stated by Violet, the large amount of tasks that must be performed by the nurses may distract them from their activities, including other people and/or other activities in their workplace. Not being able to concentrate on the work process or activity that they are currently performing, and maintaining parallel conversations, are factors that contribute to the incidence of medication errors. Therefore, attention during the preparation of medications is essential to preventing medication errors.

The participants also reported that work overload was another contributing factor for medication errors: [...] *I think that the biggest mistake is the employee overload, generally in the nursing team, as they are normally overloaded in their unit; we see that no one respects the number of beds per employee. Then, sometimes a single technician or a single nurse manages a large number of patients, and must do things quickly, and ends up doing it without attention [...]* (Christmas cactus) [...] *Sometimes a person gets twenty patients, and then the error will be much more likely to happen [...]* (Acacia) [...] *Overload of service, a lot to do at the same time, and little time; all of these contribute. We will not say that this justifies the errors, but it all contributes to medication error [...]* (Violet)

The burden on these professionals is also associated with the need for nursing professionals to have more than one job, due to their low wages: [...] *I believe that, based on low wages, he needs to have several jobs, and even if he does not have problems with the staff in that institution, he comes from other units with an overload of time, with too heavy a workload, and this decreases his attention a lot [...]* (Christmas cactus) [...] *The fact is that most of the time we have more than one job, and I think that generates a lot of stress [...]* (Daisy).

DISCUSSION

The prescription is the summary of the clinical evaluation and diagnosis, which is made after a complete examination and medical history, is obtained for the patient, and allows the correct treatment to be provided. In addition, in the hospital environment, the prescription provides a record of information and communication between the doctor, the nurse, and the pharmacist^[10]. The use of computerized electronic prescription systems is one possible solution to this problem, as when the information is entered into the system, it can be correctly and easily understood. In addition, some systems can assist the physician in selecting the appropriate drug and describe the possible drug interactions or adverse effects^[11,12].

Thus, the lack of attention is a contributing factor for medication error, which has also been described by other researchers^[13,14]. In addition, we realized that the research participants, by including lack of attention as a causal factor in their comments, perpetuate the idea of individual responsibility in this process.

Based on these responses, work overload and a reduced number of professionals can reduce the quality of NB care and result in medication errors. Thus, the work overload and lack of staff should be considered when evaluating quality improvement and error prevention methods. Furthermore, the management of professionals in the NICU is crucial, because the patients are clinically unstable, at risk of imminent death, and require complex care, constant attention, and rapid decision making. Therefore, sufficient human resources are essential to preventing work overload^[15].

Nurses who must have more than one job have lower levels of attention and concentration, and experience more stress, when performing their professional activities. Therefore, these professionals are prone to make mistakes, due to their high levels of physical and emotional exhaustion, which can lead to a lack of attention and reduce the quality of their professional care, and subsequently compromise the quality and safety of the NBs care^[14]. Unfortunately, a person's basic skills (including motivation, logic, quick reasoning, and sense of personal responsibility and preparation) are significantly reduced when confronted with fatigue and long working hours, which creates stress and exhaustion and increases the possibility of medication errors, and subsequently places the patient's safety at risk^[16,17]. We also cannot forget that promoting a culture of safety is the most important strategy for preventing medication errors^[18]. In this context, a culture of safety allows the professional to feel more secure regarding his or her doubts, without punitive consequences, and enables interpersonal discussions regarding the possibility of medication errors.

Given the specific characteristics of the NICU, the professional's routine often changes during the work process^[17]. In this change, work overload can affect the professional's performance and create a possibility for medication error. In addition, the long workdays, with extra hours and shifts, lead health professionals to sleep less and become tired most of the time, both within

the hospital and in their personal lives. Furthermore, studies have demonstrated that sleep and rest deprivation affect the quality of medical and hospital care, highlighting the imminent danger of errors that can cause irreversible damage to patients. These studies also revealed that a health professional without rest experiences a reduced cognitive function that is comparable to that experienced by an intoxicated person ^[17,19]. Therefore, the managers of healthcare professionals (especially NICU nurses) should consider strategies to enable these professionals to create a work rotation that allows rest and repose, thereby avoiding work overload and the related decrease in the quality and safety of patient care.

STUDY LIMITATIONS

This study is limited by the inclusion of participants from a single university hospital. Therefore, a multicenter study may provide additional information regarding neonatal nurses' perspectives regarding the factors that affect medication errors.

Implications for Nursing Practice

It seems essential in practice certain behaviors, such as standardizing the requirements, do not run smudged prescriptions, proper storage of medications used in the institution. It also makes up mister, develop and implement education programs focused on general principles of patient safety that include information on the use of new drugs.

The improvement of public policy can also direct actions for the safety of medication systems in neonatal customers and to strengthen the safety culture in healthcare organizations.

It is for the health institutions to promote an open channel to talk about mistakes, seeking to offer continuing education and basic training.

Ensure proper working conditions in order to improve the quality of life of employees, also it shows up as a factor that provides improved care and technical safety practices.

Research aimed at the security of the neonatal patient should be encouraged in order to build a body of knowledge that can support the re-evaluation practices, changing risk behaviors and produce more reliable medication systems and insurance.

CONCLUSIONS

The management of drug therapy in the NICU is a complex and unique process, with specific characteristics that involve numerous medications, various care activities, and extensive work pressures. Therefore, NICU nurses are prone to make mistakes, as a consequence of these unique characteristics. However, the nurses are not solely responsible for the trajectory of these errors, as the administration of medication begins with the prescription. Thus, it is essential to standardize drug prescriptions, to not execute erased prescriptions, to standardize appropriate storage, and to ensure complete and clear identification of all drugs that are used in the institution. Finally, methods are urgently needed to develop and promote a culture of safety in hospitals. In this context, public health policies (such as those developed by the National Program of Patient Safety), are the starting points for improving safety measures that are related to NB care, the medication system, and promoting a safety culture in neonatal units. These issues should also be included in undergraduate programs, which will help target patient safety from the beginning of nursing training.

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