Journal of Nursing
Revista de Enfermagem
UFPE On Line
ISSN: 1981-8963

ORIGINAL ARTICLE

IDENTIFICATION AND ANALYSIS OF ERRORS DURING MEDICATION ADMINISTRATION IN A HOSPITAL PEDIATRIC UNIT

IDENTIFICAÇÃO E ANÁLISE DE ERROS NA ADMINISTRAÇÃO DE MEDICAMENTOS EM UMA UNIDADE PEDIÁTRICA HOSPITALAR

IDENTIFICACIÓN Y ANÁLISIS DE ERRORES EN LA ADMINISTRACIÓN DE MEDICAMENTOS EN UNA UNIDAD PEDIÁTRICA DEL HOSPITAL

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ABSTRACT

Objective: to identify and analyze errors during medication administration in a hospital pediatric unit. ***Method:*** this is a descriptive study, conducted in a hospital situated in the countryside of the State of Minas Gerais, which had the participation of four professionals responsible for the medication administration process, who were subjected to the technique of structuring observation and questionnaire. ***Results:*** with regard to the environment of accomplishment of medication administration, the highlights were 10 (13,16%) inadequacies relating to noise level. As for the technique, one should highlight the lack of follow-up of the patient after its application, with 76 cases (100%), and the non-checking of the patient's name, with 48 occurrences (63,16%). There was also a highlight for the failure in performing hands hygienization, with 17 registrations (40,48%). ***Conclusion:*** it becomes necessary to develop the use of strategies that might be planned and implemented together with the nursing team and in accordance with the reality of the institution, as a way of preventing errors during the course of the medication administration. ***Descriptors***: Medication System; Medication Errors; Nursing.

RESUMO

Objetivo: identificar e analisar erros na administração de medicamentos em uma unidade pediátrica hospitalar. ***Método:*** trata-se de um estudo descritivo, desenvolvido em um hospital do interior do Estado de Minas Gerais, do qual fizeram parte quatro profissionais responsáveis pela administração de medicamentos, os quais foram submetidos à técnica da observação estruturante e questionário. ***Resultados:*** destacaram-se, no que concerne ao ambiente da realização da administração de medicamentos, 10 (13,16%) inadequações referentes ao nível de ruído. Quanto à técnica, destaca-se o não acompanhamento do paciente após a sua aplicação, com 76 casos (100%), e a não conferência do nome do paciente, com 48 ocorrências (63,16%). Houve destaque também para a falha na higienização das mãos, com 17 registros (40,48%) ***Conclusão:*** faz-se necessária a utilização de estratégias que possam ser planejadas e implementadas juntamente com a equipe de enfermagem e de acordo com a realidade da instituição, como forma de prevenção aos erros na administração de medicamentos. ***Descritores:*** Sistema de Medicação; Erros de Medicação; Enfermagem.

RESUMEN

Objetivo: identificar y analizar los errores en la administración de medicamentos en la unidad pediátrica del hospital. ***Método:*** se realizó un estudio descriptivo realizado en un hospital en el interior del estado de Minas Gerais, que hicieron parte cuatro profesionales responsables de la administración de medicamentos, los cuales fueron sometidos a la técnica de la observación estructurarte y cuestionario. ***Resultados:*** se destacaron, con respecto a la finalización de la administración de medicamentos, 10(13,16 %) insuficiencias en relación con el nivel de ruido. En cuanto a la técnica, se destaca la falta de acompañamiento del paciente después de su finalización, con 76 casos (100%), y la falta de conferencia del nombre del paciente, con 48 incidencias (63,16 %). Hubo destaque también para la falta de higienización de las manos, com 17 registros (40,48%). ***Conclusión:*** es necesario utilizar estrategias que pueden ser planeadas e implementadas junto con el equipo de enfermería y de acuerdo con la realidad de la institución, como una forma de prevención de errores en la administración de medicamentos. ***Descriptores:*** Sistema de Medicación; Errores de Medicación; Enfermería.

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INTRODUCTION

Medication administration errors are important indicators for the assessment of the quality of care and establish a meaningful relationship with the activities developed by the nursing staff in health services.[1] When referring to pediatrics, it is known that, despite the benefits of therapeutic interventions, there is a possibility of potential or effective risks, and interventions by nurses are required for its minimization.[2]

By considering that the nursing team needs to play humanized functions, it is charged with preparing the child and inform it about the procedures to which it will be subjected. For this purpose, it is important to consider the capacity of understanding, maturity and ability of the child. Accordingly, the inclusion of the child in the decision-making process is a positive factor for its treatment, because facilitates the acceptance in the administration of drugs and reduces the risk of errors.

This team also needs to consider the maternal role in this process, which might help the child to turn difficult moments into bearable ones. The role of the nursing professional is to facilitate the relationship among the child, the mother and the procedure, provide the necessary clarifications, as well as soothing the condition of grief and anguish of the child. Thus, one can facilitate the adaptation to the situation, so that, despite the suffering, mother and child might live the experience and strengthen their bonds. These experiences, when properly conducted, allow the child to continue to trustingly explore the world and accept the treatment in a less traumatic way.[3]

Among the factors that determine the complexity of the pediatric care and that might be considered as determinants of errors, one should emphasize the lack of specific knowledge on the part of nursing professional with respect to pediatrics and, moreover, the strict observation of the dosage of specific medications for children, since the use of prescribed dosages for adults can cause serious damages.

Among the pediatric techniques, the medication is an exclusive competency of the nursing team, although other professionals also perform it. This technique is considered essential, since the purposes of the child's hospitalization are targeted to the medical therapy, mainly in relation to injectable medications, whereas others might be administered within the home environment. Properly administered medications tend to reduce the length of hospital stay and treatment costs, thereby maximizing the medical therapy and the quality of life of patients.[4]

One should also consider that, due to the difficulty of administering medications in adequate quantity according to their dilution, there is the possibility of poisoning by the use of high concentrations of medication, which is an error that can seriously damage the integrity of the patient.

It is known, among researchers from the field of nursing and pediatrics, that appropriate care in relation to the practice of administering medications in children reduces the likelihood of errors and, consequently, helps in the relationship between patients and hospital practices. Given the above described scenario, this study is justified by the importance of identifying and analyzing errors during medication administration in order to ensure the care and safety of the childish population.

OBJECTIVE

- To identify and analyze the medication administration errors in a hospital pediatric unit.

METHOD

This is a descriptive study aimed at describing the characteristics of a given population or phenomenon or the establishment of relationships between variables. It involves standardized techniques of data collection, such as questionnaire and systematic observation.[5]

This study was conducted in the pediatric unit of a hospital in a municipality situated in the State of Minas Gerais, in the period from 1st to 12th October 2012. This philanthropic health institution is inserted into the practices of the Brazilian Unified Health System (known as SUS) and constitutes the practice field for the courses from the field of health of a federal university. This hospital is considered a reference center for the towns in the region, and is composed of professionals from various fields of health. It offers outpatient and inpatient pediatric care, with the purpose of meeting the needs of its coverage area.

The pediatric unit serves an average of 60 children on a monthly basis. It has 20 beds available for admission of patients and is composed by a team of eight workers who take turns as follows: four nursing assistants in the day shift and four in the night shift,

thereby fulfilling a workday of twelve hours for each shift.

We have used the fact that the professional is responsible for the medication administration and work during the day shift as an inclusion criterion for participation in the study. Accordingly, the sample of this study is composed of four nursing assistants.

The medication schedules of this sector are standardized in: 5 A.M., 11 A.M., 5 P.M. and 11 P.M. The medication schedules between 11 A.M. and 5 P.M. of the hospitalized children were monitored, according to the availability of the researcher and of the nursing assistants.

The study was conducted in a period of twelve days. Due to the fact that the four nursing assistants work every day, they were observed 12 times in the timetable of 11.A.M. and twelve times in the timetable of 5 P.M.

The observations were performed during each medication administration and with a nurse assistant at time. Each assistant separately administers the medication, and it is justified by the fact that the wards are small and by the need to prevent the movement of many people at the same time. The quantitative of observations should be 96, however, two nursing assistants were moved to another sector of the hospital during four days and other one was moved during two days, thereby reducing to 76 the total number of observations.

The technique of structured observation used in this study previously establishes what will be observed and how the record will be conducted.[5] To that end, we made use of an already validated questionnaire from a study[6] with open and closed questions, whose check list was held by the researcher according to the observations performed throughout the determined period. This questionnaire noted the elapsed time for medication administration, the environment (lighting, noise levels, interruptions, space, place for hand hygiene, cleanliness and organization), the dose of the medication (name, route, dosage and time) and the data about the procedure (query to the prescription of the medication, identification and orientation of the patient during the procedure, right technique, infusion control, checking, follow-up of the patient after medication administration and description of observations of ocurrence of errors).

The conduct in the face of an error that would provoke integrity risk to the child followed the ethical and legal protocols, that is to say, once observed, the research subject was immediately oriented to fix it with a view to ensuring the patient's safety in the medication administration process. Such orientation was exactly conducted at the moment prior to the medication administration, so that the patient did not realize that the research subject would commit the error. Thus, the secrecy and the safety were ensured. It is worth emphasizing that the mother/ caregiver of the child was not informed, because the error did not take place.

The data analysis was descriptive, based on tables and updated national and international bibliographic references.

This research was submitted for approval by the clinical board of the surveyed hospital, as well as for the Research Ethics Committee of the university in which the researchers work. Subsequently, it was approved under the protocol number 037/09, in line with the Helsinki Declaration.[7-8]

It is worth emphasizing that the participants received explanations about the project and only the subjects who agreed to participate in the research took part of the study, by signing the Free and Informed Consent Form (FICF). The aspect related to ethics, reliability and privacy of the research were ensured in accordance with the Resolution nº 196/96, which deals with researches involving human beings.[9]

RESULTS

With respect to the elapsed time for the medication administration process, we have observed that, in a total of 76 administrations, 59 (77,6%) occurred within five minutes, 14 (18,3%) were completed between six and ten minutes and 3 (3,39) needed more than 11 minutes to be finished. The data relating to the environment in which the medications were administered are presented below, in Table 1.

Table 1. Environment of conduction of medication administration. Diamantina-MG, 2012.

Items	Adequate	Inadequate
Noise level	66 (86,84%)	10 (13,16%)
lighting	71 (93,42%)	5 (6,58%)
Organization	72 (94,74%)	4 (5,26%)
Space	72 (94,74%)	4 (5,26%)
place for hand hygiene	74 (97,37%)	2 (2,63%)
cleanliness	76 (100%)	---
Continuity in administration	76 (100%)	---

It should be highlighted that, as adequate, all the aspects consistent with the literature of the field were used, among them: silent, satisfactory lighting, organization of place, space befitting the needs for medication administration, place for hands hygienization, cleaning of place and conditions for execution of the technique without interruptions.

The following aspects were considered as inadequate: high or frequent noise level, insufficient/weak or uneven lighting, difficulty in storing or presence of materials inconsistent with the procedure, insufficient or uneven space, lack of place for hands hygienization, moisture or offals and interruptions during medication administration.

The ítems of noise level and lighting stood out, respectively, with 10 (13,16%) and 5 (6,58%). It is known that these two items are facilitators of occurrence of medication errors. The noise level might distract the professional and the inadequate lighting might hamper the read in the moment of checking the medication prescription and, even, hamper the determination of the place in which the product must be administered, mainly when it comes to intravenous route.

The concentrations and doses of administered medications were also investigated and they were presented like this: ceftriaxone (1g/10ml) 4,5 ml; ceftriaxone (1g/5m) 5ml; oxacillin (500mg/ml) 4,5 ml; dipyrone (500mg/ml) 1ml , dipyrone 30 drops; dipyrone 1 pill; dipyrone (1ml/9ml) 10ml; fenoterol hydrobromide (4 drops/3ml physiological saline) 3ml; fenoterol hydrobromide (3 drops/3ml physiological saline) 3ml; prednisolone (1g/ml) 14ml; prednisolone (1g/ml) 6ml; dexchlorpheniramine 7ml; cephazolin (1g/10ml); dimethicone 6 drops; gentamicin (80g/150ml) 150ml; phytomenadione 1ml; paracetamol 1 pill; ampicillin (1g/5ml) 2,5 ml; ampicillin (500mg/5ml) 4,5 ml; ampicillin (250mg/5m) 4ml; metoclopramide hydrochloride (0.5ml/3ml) 3,5ml; hydrocortisone (100mg/5ml); furosemide (20 mg) 2 pills and cephalothin (1g/10ml) 9ml.

As for the routes of administration of these medications, one can cite the oral or intravenous routes; however, no errors were observed in this aspect. In addition, no errors in concentration were detected.

With respect to the specific information about the technique of medication administration, Table 2 presents it hereafter:

Table 2. Items relating to the issue of medication administration. Diamantina-MG, 2012.

Items	Yes	No
Follow-up of the patient after medication administration	---	76 (100%)
Checking of the patient's name	28 (36,84%)	48 (63,16%)
Checking of the medication immediatelly after administration	32 (42,10%)	44 (57,90%)
Orientation to the patient	39 (51,31%)	37 (48,70%)
Queried prescription	57 (75%)	19 (25%)

It is observed that the return for the follow-up of the patient after medication administration was completely neglected, being that it was registered in 76 (100%) of the observed medications. The second quantitatively highlighted item is the fact of not checking the patient's name, with 48 cases (63,16%). No less worrying are the items

relating to the checking of medications, orientation to the patient and query to the prescription prior to the medication administration, since these items are facilitators or, even, the medication errors themselves, and might result in serious consequences, thereby decreasing the safety of the medical therapy in children.

Regarding the errors relating to the technique of medication administration, one should emphasize the "Failure in performing hands hygienization, with 17 (40,48%), followed by "Non- checking of prescription", with 16 (38,09%), "Contamination of materials and medications", with 8 (19,05%) and "Inadequate puncture", with 1 (2,38%), which resulted in a total of 42 (100%) errors.

Concerning the errors observed during medication administration, which were not part of the assessment tool, but that, due to their severity, we have judged important to describe them, Table 3 will present below:

Table 3. Errors observed during medication administration. Diamantina-MG, 2012.

Errors	Quantitative
Non-use of procedure gloves	76
Oblivion of the physiological saline for dilution in the nursing station	2
Shutdown (by mother) of nebulization prior to the prescribed time	1
Contempt (by professional) for the medication on the bed	1
Repacking of the needle at the end of the administration	1
Demonstration of impatience	1
Administration of quantity greater than the prescribed	1
Verification of flaw in the serum tube and non-accomplishment of exchange	1
Reuse of the device for puncture	1
Total	85

The most prevalent error was the non-use of procedure gloves. Although in lesser frequency, other errors are also described. Still addressing those related to the contamination process, one can cite the repacking of the needle at the end of the administration, as well as the reuse of the device for puncture.

The shutdown of nebulization prior to the prescribed time, performed by the mother of the child, and the administration of a quantity greater than the prescribed made reference to the dosage error, which is widely reported in the national and international literature in the field of nursing.

With regard to the steps of the techniques, widely taught to academic students from graduation nursing courses, as well as to students from the technical courses and of nursing assistant, there was the registration of oblivion of the physiological saline for dilution in the nursing station, contempt for the medication on the bed, verification of flaw in the serum tube and non-accomplishment of exchange.

It is worth emphasizing that, on the verge of error, only 2 (2,6%) of the surveyed professionals reported and tried to justify it in some way. The other ones did not express their opinion about that.

DISCUSSION

Concerning the time for the medication administration, the fact of they have been administered within five minutes demonstrates the efficiency in the administration system. This fact is extremely important, whereas the delay in the use of medications can provoke unwanted effects, such as decreasing in efficacy and in the maintenance dose. In the case of antibiotics, the time of administration needs to be more rigorous, because, if they are not properly managed, these will not produce the desired effects.[6]

The following data with regard to the environment of accomplishment of medication administration are worrying, given that safety and qualification of human resources are predisposing factors for minimizing medication errors. In this regard, it is known that, in order to obtain an environment for conducting a safe medication, besides skilled human resources and in sufficient quantity, adequate physical plant, financial funds, equipment and devices with appropriate technology are needed, which reduces the likelihood of errors during medication administration.[10]

By observing the data corresponding to the concentrations and doses of the administered medications, one can realize that some medications used in pediatric prescriptions were classified as non-standardized or as non-approved; among them, it should be highlighted the dipyrone, a drug that is not approved by the Food and Drug Administration (FDA), but is usually prescribed for many hospitalized patients. Traditionally, the literature indicates that such medication must be prescribed and used only in patients with fever refractory to other antipyretics, due to its greater potential for generating adverse effects.[11]

Regarding the items relating to the technique of medication administration, in the study found in the literature[10], it was

verified that the follow-up of the patient after medication administration is essential for the safety of the medical therapy, since there is the possibility of adverse reactions or abnormalities specific for each patient. According to another study of the field of nursing[12], the non-accomplishment of this follow-up demonstrates the erroneous relationship between professional and patient, which might contribute to the occurrence of medication errors.

Regarding the errors relating to the technique of medication administration, it is worth stating that the non-accomplishment of the technique for hands hygienization prior to the medication administration is a worrying error, since the microorganisms existing within the hospital environment and, therefore, resistant, might be transported, through the hands of health professionals, for the patients. This technique is an important measure with regard to health care procedures.[13]

The lack of information of the professional in relation to the adequate way for performing hands hygienization reduces its effectiveness and its adherence. Another factor that influences is inconstant availability of materials such as paper-towel and liquid soap. In addition, the rationalization of the time spent for hands hygienization is a constant challenge for the health professionals.[14-15]

Regarding the non-checking of prescription, it is known that the medications prescriptions are tools for communication among health professionals, that is why they must be queried and checked before each administration, since the errors are present in the "medication system", which is composed of several steps, including the medication prescription.[16] Another item of utmost importance is the contamination of materials and medications, mainly when the medication to be administered is intravenous. The non-use of measures for controlling contamination can result in harms towards the patient's health.[17]

Concerning the verge of errors, it is important to emphasize that, from the recognition of the error, it becomes necessary to hold the analysis of all the components of the medication system related to the institution and the health professionals, thereby making it essential to understand the existence of system failures, i.e., one should not attribute the failures to incompetence or irresponsibility of workers.[18]

Regarding the errors observed during medication administration, the inadequate use of gloves, or the non-use, increases the occurrence of cross infection through the hands, in addition to predisposing the professional to biological risks.[19] In light of the foregoing, one needs to encourage professionals, when establishing the plan of daily care for the patient, so that they consider the need for the use of gloves, both for their own protection and for the protection of patients under their care.

Thus, one should verify the need for a continued education process, since the presented items are pretty serious and might cause risks to the safety of the individuals under the care of the health professionals.

There was also a case of demonstration of impatience, which in itself is not a medication error; however, it is a predisposing factor because the activity requires, in addition to knowledge, extreme concentration.

CONCLUSION

The determination of aspects that can reduce the error rates during medication administration in the field of pediatrics means thinking about the effective collaboration of human resources in the equity of care and in the humanization. Such aspects are often little appreciated to the detriment of the development of science and development of more advanced technologies in the field of life support.

This study has identified and analyzed relevant errors in the preparation of medications in the pediatric unit at stake. Such errors, of great gravity, indicate the need for reorganizing the medication administration process in the investigated unit, by using strategies that might be planned with the nursing team and implemented in accordance with the reality of the institution, as a way of preventing errors during the course of the medication administration. An educational approach with nursing technicians could facilitate the dissemination of knowledge and, therefore, the appreciation of the medication administration process and the safety when performing child care actions.

The study showed limitations arising from the reduced sample. Accordingly, it is of great importance that scholars can develop studies with more representative samples, as well as others with focus targeted to the triad medication administration/nursing/pediatrics, which are quite scarce topics in the national literature about nursing.

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Submission: 2013/09/19
Accepted: 2014/02/16
Publishing: 2014/04/01

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