Original Article

Patient safety in the administration of intramuscular medication in pediatrics: assessment of the nursing practice

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Segurança do paciente na administração de medicamento intramuscular em pediatria: avaliação da prática de enfermagem

Seguridad del paciente en la administración de medicamentos intramusculares en pediatría: evaluación de la práctica en enfermería

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ABSTRACT

Objective: To evaluate the nursing care regarding the intramuscular medication administration procedure in pediatrics.
Methods: It was an observational and quantitative study performed in a pediatric hospital located in the city of Fortaleza, in Ceará, Brazil. The data collection was carried out through the observation of 327 intramuscular medication administration procedures. An observational checklist composed by 25 steps was used to collect data. The performance of the 25 steps of the checklist was divided as follows: (1) five steps were applied before the procedure of intramuscular medication administration; (2) fourteen steps during the procedure; (3) six steps after the procedure.
Results: It was found that none of the five steps carried out before the intramuscular medication administration procedure were satisfactory performed. Regarding the fourteen steps applied during the procedure, six of them were satisfactory performed (42.8%). With regards to the six steps applied after the procedure, three of them were satisfactory performed (50%).
Conclusions: Fragilities that negatively impact the intramuscular medication administration procedures in pediatric patients were identified in this study.
Keywords: Pediatric nursing. Injections, intramuscular. Patient safety.

RESUMO

Objetivos: Avaliar a prática de Enfermagem quanto à administração de medicamento por via intramuscular na pediatria.
Métodos: Descritivo, observacional, quantitativo, desenvolvido mediante 327 observações da administração de medicamento intramuscular em um hospital pediátrico de nível secundário em Fortaleza-Ceará. Para as observações utilizou-se um check-list composto por 25 ações: cinco realizadas antes da administração de medicamentos, quatorze durante e seis após o procedimento.
Resultados: Constatou-se que nenhuma das ações desenvolvidas antes do procedimento de administração de medicamento intramuscular alcançou desempenho satisfatório. Para as ações realizadas durante o procedimento, averiguou-se desempenho satisfatório em seis ações (42,8%). Na etapa após o procedimento identificou-se desempenho satisfatório em três ações (50%).
Conclusões: Foram identificadas fragilidades que interferem na consolidação de práticas de segurança na administração de medicamento intramuscular em pacientes pediátricos.
Palavras-chave: Enfermagem pediátrica. Injeções intramusculares. Segurança do paciente.

RESUMEN

Objetivo: Evaluar la práctica de enfermería en cuanto a la administración de medicamentos por vía intramuscular en pediatría.
Método: Observacional, cuantitativo, desarrollado a través 327 observaciones de la administración de medicamentos intramusculares en un hospital pediátrico de nivel secundario, en Fortaleza-CE. Para las observaciones, se utilizó un check-list compuesto por 25 acciones: cinco realizadas antes de la administración de medicamentos, catorce durante su ingesta, y seis después del procedimiento.
Resultados: se constató que ninguna de las acciones desarrolladas antes del procedimiento de la administración de medicamentos intramusculares logró un desempeño satisfactorio. Para las acciones realizadas durante el procedimiento, se verificó un desempeño satisfactorio en seis acciones (42,8%). En la etapa después del procedimiento se identificó un desempeño satisfactorio en tres acciones (50%).
Conclusión: se identificaron debilidades que interfieren en la consolidación de las prácticas de seguridad en la administración de medicamentos intramusculares en pacientes pediátricos.
Palabras clave: Enfermería pediátrica. Inyecciones intramusculares. Seguridad del paciente.

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INTRODUCTION

The patient safety in the hospital environment has created a wide debate of worldwide repercussion. In recent years, there have been increasing initiatives to promote safety and quality improvement in healthcare, generating the optimization of results in the different health services offered to society[1].

The World Health Organization (WHO), in the interest of patient safety, has developed mechanisms to improve the quality of care in order to provide patient safety. With this, six international patient safety goals have been created: identifying patients correctly; improving the effectiveness of communication among care professionals; improving the safety of high-vigilance medications; ensuring surgeries with correct intervention location, correct procedure and correct patient; reducing the risk of infections associated with healthcare; and reducing the risk of injury to patients from falls[2].

From the creation of the international goals, the Brazilian Ministry of Health has approved and instituted six Basic Protocols for Patient Safety: patient identification; practice of hand hygiene in health services; safe surgery; prevention of ulcers by pressure; prevention of falls; and safety in the prescription, use and administration of medicines[3-4]. In this study, the safety protocol will be contemplated in the prescription, use and administration of medications, since even with the implementation of these protocols, it is still evident the presence of errors in the medication administration process, which can be harmful to the patient, relatives, professionals, and the health service[5].

Patient safety is a greater challenge when it comes to pediatric patients, since it is a population that is more vulnerable to medication error due to its peculiar physiological characteristics and the unavailability of adequate pharmaceutical forms in the market. It is remarkable when it is verified that about 80% of the drugs intended for use in adults are marketed for administration to children, including newborns[6-7].

The medication system consists of actions planned and implemented by health professionals in order to restore or maintain health through the use of drugs, comprising, for this, four processes: prescription, dispensing, distribution and administration[8]. In the Brazilian reality, the Nursing team is legally responsible for the administration of medication, which is understood as giving or applying to the patient a medication previously prescribed, corresponding to the last stage of the medication system, that is, the final opportunity to prevent an error in the patient's treatment process[9].

Studies have shown that errors that occur during the medication administration can be avoidable, which makes the medication system potentially related to the promotion of patient safety, automatically relating it to the Nursing team[10]. This fact is even more striking when it comes to pediatric care, since a systematic review on medication errors in children showed that the medication administration process presented the highest frequency of errors, with a rate of 72 to 75%. Thus, it is a challenge for every health institution and team to promote changes in the organizational culture, in order to allow the restructuring of processes and the creation of safety strategies in order to reduce, to an acceptable minimum, the unnecessary risks and damages associated with the assistance[7].

The administration of intramuscular injections (IM) is one of the most practiced practices in Nursing routine. The use of IM injections in emergency units is very common for pain relief, or even for faster therapeutic results. This involves a complex series of considerations and decisions regarding the volume of solution injected, the medicine to be administered, the technique, the choice of location and equipment; besides considerations regarding the age of the patients, physical traits, and pre-existing conditions[11-12].

It is necessary to be aware of the various risks involved in the administration of medications through the intramuscular route, such as persistent pain at the location, hardening, decreased sensitivity, tissue damage (nerve damage), bruises, abscesses, allergic reactions, tissue necrosis, contracture of muscle groups, fibrosis and even loss of joint movements[13].

Therefore, for a better applicability of the intramuscular medication administration process in pediatrics, the following questioning is made: how is the technique of intramuscular medication administration performed in the pediatric nursing practice?

It is believed that the Nursing practice in the implementation of the intramuscular administration of medication in pediatrics presents divergence with what is recommended in the scientific literature regarding the technique, muscle choice and pre and post procedure guidelines[14].

Thus, the objective was to evaluate the practice of the Nursing team regarding the performance of the intramuscular medication administration process.

METHODS

It is an observational, quantitative approach developed in a pediatric hospital of secondary care of the municipal network of Fortaleza-CE.

In studies with a cross-sectional design, measurements are performed in a single moment, with no follow-up period, and are useful when describing variables and their distribution patterns. When the approach is quantitative, the results are based on statistical data, which designates the mathematical way of examining the object of study[15].

A total of 327 systematic observations have been made regarding the intramuscular medication administration process performed in children attended at the referred institution and who met the following inclusion criteria: to be aged <10 years old, to have a medical prescription for intramuscular administration, and to administer the drug intramuscularly by a member of the nursing team at that institution.

Eleven nurses working in the unit of intramuscular or emergency medication administration of this institution participated in the study, one nurse and ten Nursing technicians, who met the inclusion criteria: to be a nursing professional who acts in the intramuscular administration of medication and to be working on the days when the observations were made. The exclusion criteria were: to be on vacation, leave or away from their activities during the period of data collection.

The data collection, performed from December 2014 to May 2015, on morning, afternoon or night shifts, on random days, contemplating six shifts per week, was performed through direct and systematic non-participant observation of the actions before, during, and after the administration of the medication by means of a checklist type instrument, consisting of two parts. The first part of the instrument consisted of the identification data of the child and the data concerning the prescribed medicine and the material of choice. The following variables were observed in the intramuscular administration of the medication: gender - female (43.1%) and male (56.9%); infant (18.8%), toddler (44.9%), and preschool (20.6%); body temperature - hyperthermic (70.2%) and normothermic (29.8%).

The second part consisted of twenty actions, which were: to introduce yourself to the child and/or guardian; to explain the procedure for the child and/or guardian; to calm the child down; to check the patient (prescription to the name); to wear personal protective equipment (PPE) at the time of the procedure (gloves, mask and cap); to choose the muscle, according to its size and the volume of the medicine to be administered; to palpate the site selected for injection for edema, tenderness, or granules; to avoid areas with scars, bruises or infections; to position the non-dominant hand in a suitable anatomical location and hold the muscle firmly; quickly inject the needle at a 90° angle; to aspirate the syringe, and if blood is not sucked in, slowly inject the medicine; gently withdraw the needle and loosen the skin; to apply gentle pressure to the site; to advise on avoiding on-site massage; to monitor the patient for sensory or motor change at the injection site; properly discard the materials used during the procedure; to document the administration of the medicine, recording complaints and/or adverse reactions presented by the patient, if any; and to guide the patient and/or guardian regarding adverse reactions and care, if necessary[5,16].

For each action, there were four alternatives: yes, no, partial and not applicable (NA), which should be pointed out by the researchers at the time of observation of the procedure. It should be highlighted that the instrument was validated by specialists in the field of child health as to the relevance and clarity of items with Content Validity Index (CVI) above 0.8.

The data collected in the research was stored in a database produced in Microsoft Excel of Windows 2010, processed and analyzed with descriptive statistics and according to the relevant literature. In order to analyze the performance of the professionals in each action of the intramuscular administration of medication, the performance with a cutoff point equal to or greater than 70% was adopted as satisfactory, according to previous studies[8].

The study was carried out in accordance with ethical principles, respecting the norms of the Resolution 466/2012 of the National Health Council, and approved by the Ethics Committee under Opinion No. 954.076. It should be emphasized that all the nursing professionals and the companions were oriented about the objectives of the study and agreed, through the signing of the Free and Informed Consent Term (FICT), to be observed during the accomplishment of the intramuscular medication administration process.

RESULTS

The distribution of the data on the intramuscular administration of drugs is exposed by the actions before, during and after the procedure, according to Tables 1, 2 and 3, respectively.

All the actions taken before the medication administration were considered unsatisfactory (<70% of frequency). The one with the lowest incidence of occurrence the action of introducing yourself to the child and/or guardian, which was only observed in 0.9% of the procedures, which shows a deficit in the communication between the professional and the patient and/or companion, what may cause errors during the medication administration process, resulting in consequential damages.

During the procedure, the result was unsatisfactory for the actions of choosing the muscle according to its size and the volume of the medication to be administered (35.7%), palpating the location selected for injection for edema, tenderness or granules (14.6%) and instructing on avoiding on-site massage (5.8%).

Table 1 – Distribution of the observations according to the actions performed before the intramuscular medication administration. Fortaleza, CE, Brazil, 2015

Actions performed before the procedure	N	%
To introduce yourself to the child and/or guardian	3	0.9
To explain the procedure for the child and/or guardian	34	10.3
To calm the child down	60	18.3
To check the patient (prescription to name)	137	41.8
To wear personal protective equipment at the time of the procedure (gloves, mask and cap)	8	2.4

Source: Research data, 2015.

Table 2 – Distribution of the observations, according to the actions performed during the intramuscular medication administration. Fortaleza, CE, Brazil, 2015

Actions performed during the procedure	N	%
To choose the muscle according to its size and the volume of the medicine to be administered	117	35.7
To palpate the location selected for injection for edema, tenderness, or granules	48	14.6
To avoid areas with scars, bruises, abrasions or infections	283	86.5
To place the non-dominant hand in a suitable anatomical location and hold the muscle tightly	323	98.7
Quickly inject the needle at a 90° angle	324	99
To aspirate the syringe, and if blood is not sucked in, slowly inject the medicine	270	82.5
Gently withdraw the needle and loosen the skin	272	83.1
To instruct on avoiding on-site massage	19	5.8

Source: Research data, 2015.

The action of avoiding areas with scars, bruises, abrasions or infections was performed in 86.5% of the procedures, and in 38.5% of the observations the action did not apply because the child did not have scars or bruises.

For the actions of placing the non-dominant hand in a suitable anatomical location and hold the muscle firmly; quickly inject the needle at a 90° angle; to aspirate the syringe, and if blood is not sucked in, slowly inject the medicine, and if there is blood, do not inject, withdraw the needle and start again elsewhere; gently withdraw the needle and loosen the skin; and applying gentle pressure to the location, 98.7%, 99.0%, 82.5%, and 83.1%, respectively, were considered as satisfactory actions (>70% frequency).

The actions of monitoring the patient for sensory or motor alterations at the location of the injection (6.1%) and instructing the patient and/or guardian regarding adverse reactions and care, if necessary (7.3%), were evaluated as unsatisfactory (<70% of frequency).

Table 3 – Distribution of the observations, according to the actions performed after the intramuscular medication administration. Fortaleza, CE, Brazil, 2015

Actions performed after the procedure	N	%
To monitor the patient for sensory or motor changes at the injection location	20	6.1
Properly dispose of materials used during the procedure	319	97.5
To document the administration of the medication	325	99.3
To record the patient's complaints and/or adverse reactions, if any	326	99.6
To instruct the patient and/or guardian regarding adverse reactions and care, if necessary	24	7.3

Source: Research data, 2015.

Regarding the proper disposal of the materials used and documentation of the medication administration performed, they were observed in 97.5% and 99.3% of the actions, respectively. The action of registering complaints and/or ad-

verse reactions presented by the patient, if it happened, was performed in 99.6% of the observed actions, being considered satisfactory.

DISCUSSION

The nursing team, in general, is essentially concerned with the human being, individually, in the family or in the community, performing important actions through care, taking responsibility for the comfort, acceptance, and well-being of the patients.

The intramuscular administration of medication is a medication system involving various processes and, when performed improperly and with poor technique quality, may increase the likelihood of risks to patient safety(8). When it comes to the pediatric patient, the patient safety presents a greater challenge, since this is a population more susceptible to medication errors due to their particular physiological characteristics and the unavailability of appropriate pharmaceutical forms on the market[17].

The present study pointed out that of the 327 observations made, in only 0.3% the professionals introduced themselves to the children and/or their guardians before the procedure. In 10.3%, they explained the procedure for the child and/or guardian; and in 18.3% the child was calmed down, which may contribute to the inadequate performance of the procedure, since in clarifying what will be done, the patient, especially the pediatric, becomes more collaborative and less anxious, fearful, and insecure[8].

The communication to the patient is necessary to clarify questions about the reason for the indication of the drug, its dosage and other necessary information, which may help in the prevention of adverse events[5]. In the pediatric context, the communication of the procedure helps in the physical and/or emotional preparation, it may provide the child's collaboration during the procedure, besides avoiding complications during the administration of the medication[8].

The Food and Drug Administration (FDA) evaluated reports of fatal drug errors, and identified that 16% of the causes of these errors were attributed to failure to communicate. Therefore, the prescription is an important written communication link among health professionals, seen as the beginning of a series of events within the medication process, which will result in a safe administration of a dose to the patient[18].

Regarding the choice of the muscle according to the size and volume of the medicine to be administered, it was verified that in only 35.7% of the observations made the professionals performed it; and the muscle chosen in 98.8% of the actions was the gluteal-back, and the predominant volume range was up to 1.0 ml (68.5%). According to the literature, the muscle should be selected not only considering its capacity, but also the tolerance of the patient to the volume injected, being the gluteal-back muscle indicated only for children aged >3 years old and for lower volumes to 2.0 ml in children aged <10 years old. For patients below this age, the recommended muscle is the vastus lateralis of the thigh, which can hold up to 1.5 ml in children <10 years old[14].

The performance of the appropriate discarding action of the material used during the procedure was considered satisfactory, being this action present in 97.5% of the observations. This fact is important, for it shows that professionals are subject to a minimal possibility of exposing themselves to biological material, since the inadequate disposal of sharp devices is the second cause of work accident involving Nursing professionals[19]. Thus, the distance between the location of the procedure and the disposal container and its overcrowding can contribute to the decision of the professional to reenact, evidencing the interference of organizational causes in the occupational risk. It is worth remembering that a sector of urgency and emergency requires immediate conduct, so the organizational structure should promote the safety[8].

As for the acts of documenting the medication administered and registering complaints and/or adverse reactions presented by the patient, if they happen, it was possible to identify the execution of these actions in 99.3% and 99.6% of the observations, respectively. It is imperative to document, immediately after the procedure, important data such as date, time, route of administration, place and dose in the registry of the institution, since fast and correct registration avoids accidental repetitions of administrations. In addition, adequate registration of complaints and/or adverse reactions presented by the patient is essential for good interdisciplinary communication, as it helps healthcare professionals to know the patient's condition after the drug is administered[20].

CONCLUSION

The present study made it possible to evaluate the actions performed by the Nursing team before, during and after the intramuscular medication administration in pediatrics. Regarding the findings, the study evidences the existence of failures during the administration process, especially the actions before the procedure, which did not obtain any satisfactory results. Thus, this research points out important implications related to the Nursing practice, which will contribute to the improvement of the quality of healthcare, resulting in suggestions for the implementation of effective interventions to solve the problems detected.

Therefore, it is essential to provide permanent education directed to Nursing care in the execution of the administration of medications through the intramuscular route, especially when presenting to the child and/or guardian; to explain the procedure for the child and/or guardian; to calm the child down; to check the patient; to wear gloves when performing the procedure; to choose the muscle according to its size and the volume of the medicine to be administered; to palpate the location selected for injection for edema, tenderness, or granules; to instruct on avoiding on-site massage; to monitor the patient for sensory or motor change at the location of the injection and instruct the patient; as these are essential steps to ensure the safe administration through humanized care to ensure the patient safety.

In view of the above, a situational diagnosis of the Nursing team regarding the administration of medication by the intramuscular route in pediatrics has been obtained, providing the identification of the main errors resulting from the medication administration technique, in order to guarantee a safe healthcare for the patients, their families, health professionals, and the health system as a whole. Thus, it is believed that this research will help to improve the quality of healthcare, succeeding in proposals for the implementation of effective actions to solve the situations found.

As limitations presented in this study, it can be mentioned that the research was carried out by only one researcher at each observation, and that the procedures were performed in two distinct spaces: the emergency room and the intramuscular medication room. Since emergency was not an exclusive location for the administration of intramuscular medication, that is, there was rarely exclusive care; this could be a distracting factor during the observation, in addition to the routine of the environment that could offer bias to the study.

Thus, it is highlighted the need to carry out new studies, in other contexts, with a differentiated methodology, aiming at minimizing errors in medication administration in pediatrics.

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