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Professional performance in the administration of medicines in pediatrics: a study cross-sectional observational

Desempeño de profesionales en la administración de medicamentos en pediatria: un estudio observacional transversal

Desempenho dos profissionais na administração de medicamentos na pediatria: um estudo observacional transversal

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ABSTRACT

Objectives: to evaluate Patient Safety actions carried out by nurses in the Administration of Medicines in Pediatrics. **Methods:** observational, cross-sectional, quantitative study carried out in 2018, with 25 nurses from a Hospital in Peru. 183 observations were made; the instrument Safety of the patient was used in the administration of medicines in Pediatrics Spanish version. The performance of the professionals was evaluated by the Positivity Index. **Results**: of 22 itens observed, five were adequate, five were safe, two were classified as borderline and ten as endurable among those who stand out; Bring to bed only medications prescribed for a single child and maintains an adequate record of prepared medications that will be stored. **Conclusions:** weaknesses were observed in the medication administration process, since only 10 itens were classified as safe or adequate, reinforcing the need for permanent education activities by the institution for nursing training.
Descriptors: Patient Safety; Professional Performance Evaluation; Quality of Health Care; Pediatrics; Nursing.

RESUMEN

Objetivos: evaluar acciones de Seguridad del Paciente realizadas por enfermeras en la Administración de Medicamentos en Pediatria. **Métodos:** estudio observacional, transversal, cuantitativo realizado el 2018, con 25 enfermeras de un Hospital en Peru. Fueron realizadas 183 observaciones, se utilizó el instrumento Seguridad del paciente en la administración de medicamentos en Pediatria versión español. El desempeño de los profesionales fue evaluado por el Índice de Positividad. **Resultados:** de 22 ítems observados, cinco fueron adecuados, cinco ítens seguros, dos clasificados como limíte y diez como sufribles entre los que se destacan; Lleva a la cama solo los medicamentos prescritos a un único niño y Mantiene registro adecuado de medicamentos preparados que serán almacenados. **Conclusiones:** se observo fragilidades en el proceso de administración de medicamentos, visto que solamente 10 ítems fueron clasificados como seguros o adecuados, reforzando la necesidad de actividades de educación permanente por la institución, para la capacitación de enfermería.
Descriptores: Seguridad del Paciente; Evaluación del Desempeño Profesional; Calidad de la Atención de Salud; Pediatría; Enfermería.

RESUMO

Objetivos: avaliar as ações Segurança do Paciente dos profissionais de enfermagem na Administração de Medicamentos na Pediatria **Métodos:** estudo observacional, transversal, quantitativo realizado em 2018, com 25 enfermeiras de um Hospital do Peru. 183 observações foram feitas, utilizou-se o instrumento Segurança do Paciente na administração de medicamentos em Pediatria versão em español. O desempenho dos profissionais foi avaliado pelo Índice de Positividade. **Resultados:** dos 22 itens observados, cinco eram adequados, cinco itens seguros, dois classificados como limítrofes e dez como toleráveis, entre os quais se destacam; Leva para a cama apenas medicamentos prescritos para uma única criança e mantém um registro adequado dos medicamentos preparados que serão armazenados. **Conclusões:** observamos fragilidades no processo de administração de medicamentos, visto que apenas 10 itens foram classificados como seguros ou adequados, reforçando a necessidade de ações de educação permanente por parte da instituição para a formação do enfermeiro.
Descritores: Segurança do Paciente; Avaliação de Desempenho Profissional; Qualidade da Assistência à Saúde; Pediatria; Enfermagem.

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INTRODUCTION

The discussion on patient safety in the last years and around the world, special attention has been received by the search for quality in the provision of care to the health of the people, in particular from the children[1]. Health professionals have been motivated to promote patient safety in their work environment, aiming to understand how the equipments work and act in relation to the safety of the patient[2]. In agreement with the World Health Organization (WHO), Patient safety is defined as the reduction, to an acceptable minimum, of unnecessary harm risk during health care[3]. In this conception, the incorrect administration of medications is a serious problem in health services, being considered one of the main adverse effects suffered by hospitalized patients[1]. With the objective of reducing the damages associated with the use of medications, the WHO launches in 2017 the third Global Patient Safety Challenge whose theme was "Medication without harm (Medicación sin daños)"[4].

In the Brazilian context, the study carried out with patients admitted to a hospital in Sao Paulo, I observe the work of 18 nursing technicians involved in the process of administering intravenous medications in an intensive care unit (ICU) and I identify that, of a total of 180 doses of medications observed, 125 (69.5%) presented errors during administration, whereas 125 (69.5%) presented at least one dilution error in 90 doses (72%) more than one error occurred per dose[5]. Such confirmation indicates the need to manage the risk of failures in the administration of medicines by means of the interposition of security barriers between dangers and possible errors. It is highlighted that these errors have unfavorable repercussions for patients and their families, leading to disability, prolonging the time of hospitalization and recovery, being able to evolve to death[6]. Therefore, its prevention must involve the entire health team, highlighting the nursing team, for being the main responsible for the stages of preparation and administration of medicines[7]. For being the main responsible for the stages of preparation and administration of medicines, based on nursing professionals, providing the client with care free from damages caused by negligence, imperfect or inprudent[8]. In this way, for the nurse, acting in the direct care of the client, also the last possible barrier to the effectiveness of the medication error, a more careful observation on the subject becomes essential, de form to develop strategies that promote greater security to customers, mainly in the pediatric population that has different pharmacodynamic characteristics from adults, and the Nursing team itself.

Faced with this problem, the need to review a high-risk process for pediatric patients is evident and of importance in using the observation of the technique that nurses perform during the drug preparation and administration process to identify the fragile points involved in this process, condition that can contribute to the implementation of prevention and control measures.

OBJECTIVES

To evaluate the patient safety actions carried out by nurses in the administration of medications in pediatrics.

METHODS

Ethical aspects

The study was approved by the Ethics and Research Committee of the Federal University of Ceará and by the Ethics and Research Committee (ERC) of the Regional Hospital of Lambayeque in Peru.

Study design

Observational, cross-sectional study with a quantitative approach carried out in the pediatric units of the Regional Hospital of Lambayeque, Peru. The investigation was conducted in the period from March to May 2018.

The preparation of this document was carried out based on the design of the international recommendations for the publication of observational studies. "the Strengthening the Reporting of Observational Studies in Epidemiology" (STROBE)[9].

Participants

The institution in which the study was developed has 218 nurses who work in various sectors with assistance, management and / or permanent education functions. However, the population of this research was made up of 25 nurses who participate in the medication administration process in pediatric hospitalization servicesemergency and pediatric intensive care unit.

Sample

To select the sample, the following inclusion criteria were established: be a Nurse and act in the process of administering medications to children and adolescents hospitalized in the services and have a professional relationship in the hospital for at least six months. The exclusion criteria defined were: being on vacation, leave or being separated from their activities during the data collection period.

After applying the established criteria, the sample consisted of 25 nurses, who were observed during the medication administration process. To determine the number of observations that should be made during the nurses' practice, the sample calculation based on finite populations was used, taking into consideration that in the last quarter before data collection, on average, 860 children were cared for in the pediatric services, according to the daily registry of that service[10]. The significance level of 95%, sampling error of 5% and proportion of the occurrence of the phenomenon of 80% were considered as parameters[11]. The recommendation of the literature was also followed that for each item evaluated, 5 to 10 observations should be made[12-13].

According to these parameters, it was established that a total of 183 observations of the medication administration process should be made, which were divided among the 25 nursing professionals, corresponding to an average of seven observations per nurse.

Procedure

The collection was carried out by two students of the tenth (last) semester of nursing graduation from a University of Peru who

received theoretical and practical training (simulation) of 8 hours, being 4 hours on the application of the Patient Safety Instrument in the Administration of Medicines in Pediatrics Spanish version (PSAMP-Sv) and on how to make the individual approach to each professional. Therefore, they should take the following actions: explain the purpose of the study; request authorization by signing the Term of Free and Informed Consent; in the training to carry out the observations of the medication administration process, the students were oriented to use the sampling technique for convenience and consecutively, having to wait for the event studied to occur (preparation and administration of medications in pediatrics). The observer was positioned close to the place where the action would be developed, observing and recording all the actions carried out by the nurse, according to the instrument. PSAMP-Sv. Therefore, they received copies of the SPAMP-Sv instrument, board, pen, and clock. The nurse was evaluated regarding the actions of each domain, whose responses could be: 1- never, 2- almost never, 3- Sometimes, 4- Almost always and 5- always, according to the performance of the actions of the medication administration process, as recommended by the author of PSAMP Portuguese version[14]. The average time of each observation varied from 20 to 25 minutes.

Variable

Professional performance was objectified with the aid of the patient safety instrument in the administration of medications in Pediatrics Spanish version (PSAMP-Sv) containing nine domains of drug administration in hospitalized children[15-16]. Each domain has from 1 to 5 items, distributed as follows: Domain 1- Correct Patient (1 item); Domain 2- Correct medication (4 items); Domain 3- Correct route (4 items); Sunday 4- Correct time (3 items); Domain 5- Correct dose (5 items); Domain 6- Correct registration (4 items); Domain 7- Correct orientation (2 items); 8- Correct form (1 item); and 9- Correct answer (2 items); totaling 26 items. The translation and validation of the PSAMP-Sv instrument was considered reliable, since the reliability presented high internal consistency, with the final version consisting of 26 items, distributed in nine domains[17].

The performance of the professionals in the actions of the preparation and administration of medications of the PSAMP-Sv instrument were observed, with the exception of items 17 (Returns the leftovers of unadministered medications to the pharmacy), 19 (Notifies the Quality Management office in the Registration Form and reports of incidents, adverse reactions and adverse events), 21 (Monitors the temperature of the medicine conditioning refrigerator by recording the values daily) and 26 (Informs the doctor who prescribed all the effects different from those expected (in intensity and form) for the medicine), since they consist of actions in which professionals should respond and were not observed, In addition, such actions are not necessary in all drug preparations, and because access to other sources would be necessary, such as records in books of observations and intercurrences. Thus, 22 actions were observed.

Statistic analysis

The data were processed in SPSS 20.0, license nº 1010113007, and presented in tables with absolute frequencies and relative and the averages of the numerical variables (age, time of training, time of professional experience and weekly hours of service).

The adhesion rate of the nurses regarding the recommended actions was calculated using the following formula: Adherence (%) = Actions taken / Opportunities X 100[17].

To assess the degree of conformity of healthcare practice, in terms of quality, the Positivity Index was used[18], in which: 100% adhesion represents desirable assistance; from 90 to 99% adequate assistance; from 80 to 89% safe attendance; from 70 to 79% a limited assistance and less than 70% an undesirable or supportable assistance. It is highlighted that this index was the same one used by the author of the SPAMP instrument, Portuguese version[16].

Also as well as in the study[16] of construction and validation of the SPAMP instrument, only response 5 was considered adequate (always), since the actions recommended in the protocol for Prescription, use and administration of medicines[15] should always be carried out to avoid the occurrence of incidents and promote patient safety, since a single time that the professional does not perform it may be due to an adverse event, which can cause harm to the patient. Thus, responses signed with 1 (never), 2 (almost never), 3 (sometimes) or 4 (almost always) were considered inappropriate.

RESULTS

In this investigation, 25 nurses were observed during the preparation and administration of 183 doses of medications in pediatrics. The characterization of the sample in terms of sociodemographic characteristics and professional experience are shown in table1.

The data in Table 1 indicate that all the nurses were female (100.0%), whose age phase ranged from 27 to 41 years and the mean age was 33.3 (± 3.8) years. Regarding vocational training, 84% of the sample had specialization. The time of professional experience ranged from 2 to 15 years, of which 48% of the nurses referred from three to five years and 48% from six to ten years. Pediatric experience predominated for less than five years (72%). The average weekly workload of 40% of the nurses was 37 hours and all worked in the day and night period. The average weekly workload of 40% of the nurses was 37 hours and all worked in the day and night period.

The analysis of the nurses' performance by the positivity index of the observations of the pediatric medication administration process showed that no action presented the desirable positivity index (PI = 100%). These data can be observed in table 2.

In the analysis of the 22 actions observed in the preparation and administration of medications, five items presented an adequate positive index of quality of care (QC), they were: item 6 - Identify the prescribed route of administration (PI = 96.7%); Item 7- Verify if the prescribed route is the recommended technique to administer the drug (PI = 98.4%); Item 8- Wash hands before preparing medications (PI = 91.8%); Item 11- Administer the medication at the correct time (IP = 97.8%); and item 18- Record in the Kardex the schedule of administration and in the Clinical History occurrences of the drug immediately after administering each dose of the drug (PI = 97.8%).

The other items were classified by the PI as follows: five items presented safe quality of care (1, 5, 10, 12 and 24); of the items were classified as borderline (4 and 14); and as it was possible, there were ten items (2, 3, 9, 13, 15, 16, 20, 22, 23 and 25).

Table 1 – Distribution of professionals according to their sociodemographic characteristics and professional experience, Lambayeque, Peru, 2018

Variables	n	%
Sex		
Feminine	25	100
Age (years)		
27 – 31	11	44.0
32 – 36	8	32.0
37 – 41	6	24.0
Vocational training		
Mastered	3	12.0
Doctorate	1	4.0
Specialization	21	84.0
Time of professional experiece (years)		
2 - 5	12	48.0
6 - 10	12	48.0
11 - 15	1	4.0
Time of experience in pediatrícs (years)		
2 - 4	18	72.0
5 - 6	7	28.0
Weekly hourly load		
36	7	28.0
37	10	40.0
48	8	32.0
Work in Pediatric hospitalization		
Litle wearing	4	16.0
Very exhausting	21	84.0

DISCUSSION

During the observation of the drug preparation and administration process, the prevalence of female professionals was verified (100.0%) what is expected, due to the predominance of women in nursing who have been a representation for the nursing career that instinctively developed the sense of human care for others[19]. A similar result was identified in another research, in which female professionals also prevailed (83.07%), confirming that there are many decades, the health sector is structurally and historically female[20].

In relation to the age of the participants, the age phase ranged from 27 to 41 years with a mean of 33.3 (+ 3.8) years. These data indicate that the professionals who participated in this study have characteristics of emotional maturity, physical, intellectual and behavioral capacities that allow them to achieve greater stability and greater ability to infer in the care assistance activities. Still, these results differ from those identified in the study carried out in Peru, in which 70% (31/44) of the graduates were between 41 and 50 years old and 85% (37/44) of the respondents were female[21].

Regarding the time of professional experience, 48% of the professionals referred from three to five years and 48% reported from six to ten years. As experience in pediatrics, 72% reported

Table 2 – Analysis of the observations of the preparation and administration of medications by the pediatric nurses of the hospital, Lambayeque, Peru, 2018

Observed actions of drug preparation and administration	N=183	PI*
1 - Use at least two identifiers (child's full name, date of birth, or medical record number) to identify the child before administering medication.	158	86.3
2 - Confirm the name of the medicine with the prescription before giving it to the child.	108	59.0
3 - Bring to bed only medications prescribed for a single child	46	25.1
4 - Administer medication by verbal order only in an emergency.	130	71.0
5 - Confirm if the child is not allergic to the prescribed medication, identifying it differently with a bracelet and notice in the medical record, alerting the entire team.	151	82.5
6 - Identify the prescribed route of administration for the drug.	177	96.7
7 - Check if the prescribed route is the recommended technique for administering the medication	180	98.4
8 - Wash your hands before preparing and administering medications.	168	91.8
9 - Uses aseptic materials and techniques to administer medications according to the different routes of administration.	116	63.3
10 - Prepare the medicine immediately before administration.	148	80.9
11 - Administer the medication at the correct time.	179	97.8
12 - Adjust the medication administration schedules to the routine already established before your hospitalization.	152	83.1
13 - Please carefully confirm the dosage according to the medical prescription for the drug	108	59.0
14 - Confirm drip rate, programming and operation of continuous infusion pumps with medical prescription.	130	71.0
15 - Double check by two professionals of the dilution calculations and administration of potentially dangerous drugs or high surveillance drugs.	13	7.1
16 - Uses standard measuring instruments in the preparation of medications to measure the exact dose (ex: millimeter syringes, dosing cups).	79	43.2
17 - Return any unadministered leftovers to the pharmacy.	-	-
18 - Record in the Kardex the schedule of administration and in the medical history occurrences of the drug immediately after administering each dose.	179	97.8
19 - Report incidents, adverse reactions and adverse events to the Quality Management office in the Registration and Report Card.	-	-
20 - Maintains an adequate record of prepared drugs that will be stored (with date and time of handling, drug concentration, name of the person responsible for preparation and validity).	35	19.1
21 - Monitors the temperature of the medicine-conditioning refrigerator by recording the values daily.	-	-
22 - Clarifies doubts about ineligibility of the prescription, indication of the drug and dosage before administering the drug.	73	39.9
23 - Guides the child and the companion on the medication administered and the justification, the indication, the frequency with which it will be administered and the expected effects.	23	12.6
24 - Verifies if the medicine to be administered has a pharmaceutical presentation compatible with the route of administration of the medical prescription.	152	83.1
25 - Evaluate the child to identify, when possible, if the medication had the desired effect.	-	-
26 - Inform the doctor who prescribed all the different effects than expected (in intensity and form) for the drug.	55	30.1

** PI – Index of Positivity; - = Unobserved actions.*

between two and four years. The average weekly hourly workload of 40% of the nurses was 37 hours and all worked in the daytime and nighttime periods. Similar data were found in another study since 66% of the sample had more than 10 years of work in the profession, 54% of the professionals have worked in the neonatal ICU for less than ten years, 69% had less than 40 hours of work per week and all of them performed direct patient care[22]. Meanwhile, it is appropriate to highlight that the lack of experience was indicated by the referred study as a risk factor for the occurrence of drug-related incidents.

The work in pediatrics was referred to by 84% of the nurses as very exhausting, which can cause a state of physical, emotional or mental exhaustion, affecting their health and causing doubts about their competence in their work. The daily work shift of the pediatric nursing team is a paradox, proving competitive and exhausting, both physically and psychologically. In the morning, the team is confronted with the rush and agitation of technical and bureaucratic activities and with the intense flow of people circulating through the unit. In the afternoon, it seems to be calmer, however, the team develops its activities parallel to the visiting hours. But at night, dissatisfaction predominates, "it falls asleep", but it does not sleep, it rests, because there is fear of the unforeseen[23]. When analyzing the 22 actions observed in the preparation and administration of medications, it was verified that five items presented a positive index in the quality of care (QC) adecute (6, 7, 8, 11 y 18). In a divergent way, an integrative review that aimed to identify the evidences and the implications of the errors in the administration of medicines in the patient safety, I verify that the main errors found in the analyzed publications were dosage error (n = 27; 67.5%), wrong medication (n = 25; 62.5%); change of patient (n = 21; 52.5%); time error (n = 20; 50%); wrong way (n = 17; 42.5%)[24]. The responsibility of the professionals is highlighted in knowing the process they carry out, which involves from the calculation and dilution of the medication, the correct techniques for the preparation and handling, the importance of respecting the schedule, as well as knowing the routes of administration of the medication.

Regarding the items related to the identification of the prescribed route for drug administration and verification if the route is the recommended one, the data obtained in the present investigation corroborate with that found in another study[25] that I observe the preparation and administration of 577 doses of medication by nursing professionals. The results found in the aforementioned study showed that in all the observations made, the professionals made the conference of the prescribed route and used the technically recommended route**.** The calculation of global adhesion for this item was 85.7%, also configuring as safe assistance.

Among the behaviors observed in the present investigation, the item; Wash your hands before preparing medications, I present an adequate adhesion rate (IP = 91.8%). However, this result differs from the results found in another study that observed that hand washing before the preparation and administration of medications was not carried out in 570 (98.8%) observations[25]. Another descriptive study carried out in a public hospital in the Southeast identified that 70.2% of the sample did not perform hand sanitization before preparing the drugs and 81.1% did not sanitize before administering it[26]. These data show that despite the importance of hand hygiene being disseminated, it is still not materialized in the daily care work. Note that in this study the practice of hand hygiene is being carried out, avoiding risks in the safety of the administration of medications in pediatric services.

However, it is important to highlight that the procedure of the hand sanitization technique is performed inadequately in daily practice, since some steps are not carried out this procedure, this being a matter of concern with the quantity (carry out the action) and not with the quality (carry out the correct way) of this act. On this, the literature points out that one of the main failures in the hand sanitization technique is the time of completion less than recommended (<40 seconds)[27]. Therefore, the need to reinforce this action is highlighted, since the quality performance of the assistance that can be suffered.

About the item; Administer the medicine at the correct time, the result found in this research differs from that shown in another study[25], seen that in only 67.6% (317) of the observations the professionals prepared the drug in the period that guarantees the prescribed time. The general adherence rate for this item was 50%, classified by the positivity index as a bearable assistance.

Another item that presented PI considered adequate was; Record in the Kardex the schedule of administration and in the Clinical History occurrences of the medication immediately after administering each dose. This result counteracts what was found in another study carried out in Brazil in which the action "the professional set the prescribed time for the administration of the medication in the medical prescription sheet" it was classified as a borderline IPwith an adherence rate of 72.4% (418). The general adherence rate for the correct registration item was considered as affordable assistance, corresponding to 33.3%, for every one hundred observation opportunities. It was also verified that in 11.9% (69) of the observed cases there were occurrences during the administration process, including delays, cancellations, shortages, patient rejection and adverse events after administration[25].

Regarding the correct registration of medication administration, it is highlighted that it ensures that the treatment continues correctly, therefore, it is important to record the correct schedule in the prescription and check each dose, and report any occurrence related to medications, such as: need for delay, cancellation, patient refuses to receive medication or reason for non-medication (14). This consists of a strategy to avoid the occurrence of errors in the medication process, and to offer good care and safety to patients.

In relation to the correct orientation domain, the action "Guide the child and the companion on the medication administered and the justification for the indication, the frequency with which it will be administered and the expected effects" was classified as tolerable (IP = 12.6%). Similarly, an investigation carried out in the surgical ICU of a public hospital in the state of Sergipe, Brazil, I found as one of the main errors the non-adherence to the realization of the correct orientation, since most of the professionals do not guide the patient about the medication administered, name and expected effects, regardless of the level of consciousness or presence of the companion[25]. This may be due to the overload of work in emergency units and hospitalization, as in intensive care patients are under sedation or unconscious effects, as well as limitations of the presence of relatives, with consequent risk

to the health of the patients that its nature requires extreme care. Therefore, the low adherence in the item of orientation about the medication, denotes a sufficient assistance, which compromises the quality of the assistance to the child in the hospital environment.

Thus, in the present study, the adapted version of the PSAMP-Sv instrument presented a high percentage of understanding and had good acceptance of the instrument items, which was verified by the evaluation of the actions carried out by the nurses.

Study limitations

Among the limitations of this study, the scarcity of research on the subject stands out and the fact that it was carried out in a single institution, which points to the need to carry out new studies to enable the construction of new evidence regarding the subject in the different regions of the country, increasing your discussions in the scientific and clinical community, to culminate in improvements in actions to promote safety in drug administration and in the development of instruments for evaluating routine activities for drug administration in pediatrics in order to obtain a safer practice.

Contributions to the nursing/health area

The study developed makes it possible to understand the performance of nurses in the practice of preparing and administering medications in pediatrics, fundamental to produce specific information on actions to promote patient safety, in order to strengthen national initiatives to improve patient safety, work on prevention and instigate a strong culture of patient safety, and promote the exchange of experiences between centers that are essential to improve care.

CONCLUSIONS

Based on the proposed objective and results obtained, it can be concluded that, when evaluating the performance of nurses in the process of administering medications in pediatrics at the hospital in Peru, no action presented the desirable positivity index (IP = 100%). The quality of care, according to the positivity index, was adequate in five items, safe also in five items; limit yourself to two; and I present suffrable IP in ten items.

Faced with the data of the positivity index, the occurrence of weaknesses in the medication administration process is verified, this reinforces the need for the institution's permanent education to carry out training of the Nursing team to promote patient safety in precarion and administration of medications in pediatrics.

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