Original Article

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TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

SAFETY PROTOCOL ON MEDICATION PRESCRIPTION, USE AND ADMINISTRATION: MAPPING OF NURSING INTERVENTIONS

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ABSTRACT

Objective: to analyze the correspondence between actions contemplated in the safety protocol on medication prescription, use and administration of the Ministry of Health with interventions of the Nursing Interventions Classification, by means of cross-mapping.
Method: a descriptive study developed in four stages: extraction of the protocol's Nursing actions; identification of the interventions of the Nursing Interventions Classification; cross-mapping; and cross-mapping validation by experts.
Results: 61 actions of the protocol and 32 interventions of the Nursing Interventions Classification were identified. After two rounds of mapping analysis by the experts, correspondence was identified between 53 actions and seven interventions. The interventions that presented the highest correspondence were the following: Medication Administration, Medication Management and Medication Prescription. Of the 53 mapped actions of the protocol, 56,6% were considered more detailed and specific than the activities of the interventions, 20,8% were classified as similar in meaning, 17,0% as broader and general, and 5,7% were only mapped with the title and definition of the intervention.
Conclusion: the mapped actions of the protocol were considered more detailed and specific in relation to the activities of the interventions of the Nursing Interventions Classification. The unmapped interventions can contribute to elaborating operational protocols that expand the Nursing actions related to the mitigation of medication errors.

DESCRIPTORS: Standardized terminology in Nursing. Patient safety. Medication errors. Drug treatment management. Nursing team. Strategies.

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PROTOCOLO DE SEGURANÇA NA PRESCRIÇÃO, USO E ADMINISTRAÇÃO DE MEDICAMENTOS: MAPEAMENTO DE INTERVENÇÕES DE ENFERMAGEM

RESUMO

Objetivo: analisar a correspondência entre ações contempladas no protocolo de segurança na prescrição, uso e administração de medicamentos do Ministério da Saúde com intervenções da Classificação de Intervenções de Enfermagem, por meio do mapeamento cruzado.
Método: estudo descritivo desenvolvido em quatro etapas: extração das ações de enfermagem do protocolo; identificação das intervenções da Classificação de Intervenções de Enfermagem; mapeamento cruzado; e validação do mapeamento cruzado por peritos.
Resultados: foram identificadas 61 ações do protocolo e 32 intervenções da Classificação de Intervenções de Enfermagem. Após duas rodadas de análise do mapeamento pelos peritos, identificou-se correspondência de 53 ações com sete intervenções. As intervenções que apresentaram maior correspondência foram: administração de medicamentos, controle de medicamentos e prescrição de medicamentos. Das 53 ações do protocolo mapeadas, 56,6% foram consideradas mais detalhadas e específicas do que as atividades das intervenções, 20,8% foram classificadas como similares em significado, 17,0% como mais amplas e gerais e 5,7% foram mapeadas apenas com o título e definição da intervenção.
Conclusão: as ações do protocolo mapeadas foram consideradas mais detalhadas e específicas em relação às atividades das intervenções da Classificação de Intervenções de Enfermagem. As intervenções não mapeadas podem contribuir para a construção de protocolos operacionais que ampliem as ações de enfermagem relacionadas à mitigação de erros de medicação.

DESCRITORES: Terminologia padronizada em enfermagem. Segurança do paciente. Erros de medicação. Conduta do tratamento medicamentoso. Equipe de enfermagem. Estratégias.

PROTOCOLO DE SEGURIDAD PARA LA PRESCRIPCIÓN, EL USO Y LA ADMINISTRACIÓN DE MEDICAMENTOS: MAPEO DE INTERVENCIONES DE ENFERMERÍA

RESUMEN

Objetivo: analizar la correspondencia entre las acciones contempladas en el protocolo de seguridad para la prescripción, el uso y la administración de medicamentos del Ministerio de la Salud y las intervenciones de la Clasificación de Intervenciones de Enfermería, por medio de la técnica de mapo cruzado.
Método: estudio descriptivo desarrollado en cuatro etapas: extracción de las acciones de Enfermería del protocolo; identificación de las intervenciones de la Clasificación de Intervenciones de Enfermería; mapeo cruzado; y validación del mapeo cruzado a cargo de expertos.
Resultados: se identificaron 61 acciones del protocolo y 32 intervenciones de la Clasificación de Intervenciones de Enfermería. Después de dos rondas de análisis del mapo a cargo de los expertos, se identificó correspondencia entre 53 acciones y siete intervenciones. Las intervenciones que presentaron mayor correspondencia fueron las siguientes: administración de medicamentos, control de medicamentos y prescripción de medicamentos. De las 53 acciones del protocolo mapeadas, se consideró que el 56,6% eran más detalladas y específicas que las actividades de las intervenciones, el 20,8% fueron clasificadas como similares en relación al significado, el 17,0% como más amplias y generales y el 5,7% se mapearon solamente con el título y la definición de la intervención.
Conclusión: se consideró que las acciones del protocolo mapeadas eran más detalladas y específicas en relación con las actividades de las intervenciones de la Clasificación de Intervenciones de Enfermería. Las intervenciones no mapeadas pueden ser útiles para elaborar protocolos operativos que amplíen las acciones de Enfermería relacionadas a la mitigación de errores de medicación.

DESCRIPTORES: Terminología estandarizada de Enfermería. Seguridad del paciente. Errores de medicación. Conducta del tratamiento medicamentoso. Equipo de Enfermería. Estrategias.

INTRODUCTION

The World Health Organization (WHO) establishes “Medication without harms” as the third global challenge for patient safety and the expectation is to reduce by 50% the severe avoidable harms involving medications by 2022[1]. Incidents related to medication errors can occur under the control of the health professionals in different stages of the medication process, such as prescription, dispensing, distribution and monitoring of medication use[2].

In 2013, Brazil instituted the National Patient Safety Program (*Programa Nacional de Segurança do Paciente*, PNSP) through Ordinance No. 529 of the Ministry of Health, whose objective is to contribute to the qualification of health care in the entire national territory. Among the strategies for implementing the program are the elaboration and validation of protocols aimed at patient safety in different areas, including the safety protocol on medication prescription, use and administration[3]. This document seeks to identify the nature and determinants of the medication-related errors, as well as to present actions to prevent them. It is emphasized that this protocol must be applied in all health institutions where medications are used[4].

Although the reduction of medication errors is a multidisciplinary responsibility[5–6], the determining role of the Nursing team is emphasized. It is known that nurses are responsible for administering medications, a stage considered as the last possible barrier capable of preventing the emergence of errors resulting or not from previous stages[7].

Given this scenario, the importance of the technical-scientific knowledge for planning the Nursing actions and decision-making is ratified, so as to minimize the harms to the patient resulting from medication-related errors[7]. To achieve that, it becomes necessary to use Nursing classification systems in order to improve communication between nurses and other team members, promote efficiency in the continuity of patient care, leverage the documentation of the Nursing practices and generate evidence related to the topic in question, so that the data may be easily understood and aggregated to produce knowledge[8].

In this context, the Nursing Interventions Classification (NIC) is a comprehensive and standardized classification that describes the interventions performed by nurses, based on clinical judgments and knowledge. It consists of 554 Nursing interventions, which are organized into seven domains and 30 classes[9].

However, it is noted that the implementation of the classification systems in Nursing care still faces obstacles, with many inconsistencies between standardized (classification systems, taxonomies) and non-standardized language. Thus, to identify such aspects, the cross-mapping methodology has been adopted, through which it is possible to compare terms from different terminologies and determine their linguistic and semantic equivalence[10].

When considering the diversity of actions in the safety protocol on medication prescription, use and administration[4] related to the Nursing practice, it becomes necessary to compare this non-standard language to the standardized one, herein represented by the NIC. Thus, it will be possible to identify the applicability of this taxonomy with respect to that particular international goal for patient safety.

This study aimed at analyzing the correspondence between the actions contemplated in the safety protocol on medication prescription, use and administration of the Ministry of Health and the NIC, by means of cross-mapping.

METHOD

This is a descriptive research study, developed from the cross-mapping[10] between the safety protocol on medication prescription, use and administration of the Ministry of Health[4] and the NIC[9]. The guidelines set forth in the Standards for Quality Improvement Reporting Excellence (SQUIRE),

version 2.0[11], were considered for structuring and writing the research. Data collection was conducted between January and September 2019.

The study was developed in four stages. In the first stage, the study protocol[4] was elaborated in order to identify and categorize the Nursing actions related to the prevention of medication errors.

In the second stage, the NIC interventions and their respective activities[9] were listed, associated with the medication process and inserted in the Complex Physiological domain, in the Medication Management class.

The third stage consisted in elaborating the cross-mapping between the protocol's Nursing actions and the NIC interventions, based on the following rules[10,12]: using the most specific and appropriate NIC intervention; mapping the "meaning" *versus* the words, not only the words; using the action's keyword listed in the protocol to map the NIC intervention; ensuring consistency between the definition of the intervention and the action to be linked; mapping the NIC intervention, starting from its title and definition and considering the most appropriate activities; and considering the Nursing actions of the protocols with two or more verbs in different interventions, in order for them to be turned into two or more corresponding interventions. It is noted that the cross-mapping was developed independently by two researchers (1 undergraduate student and 1 PhD student) in Excel® spreadsheets and, subsequently, there was an in-person meeting with the participation of a fourth researcher (PhD 1) to discuss the differences and propose a single version.

In the fourth stage, five expert nurses evaluated the mapping independently[13]. The literature presents disagreements as to the ideal number of experts to be consulted, with references recommending between five and ten participants[13–14]. In addition to the quantitative selection of experts, the authors reinforce care in their qualitative selection with regard to training, qualification, availability and expertise with the topic of the instrument to be evaluated[14].

Thus, for assembling the experts committee, selection criteria that would ensure the participants' knowledge about the subject matter in question were considered in order to ensure reliability of the results[13–14]. Nurses with a minimum professional experience of five years in teaching and/or in assistance were selected, as well as with scientific production on the theme of patient safety and Nursing classification systems[12–14]. The identification of the potential participants for this stage took place from nominations by the members of the authors' research group and by analyzing their resumes via the *Lattes* platform.

The expert nurses received the following via email: characterization form corresponding to the professional profile, instrument related to the cross-mapping, invitation letter with detailed guidelines related to how to fill in the instrument, PDF file with the NIC interventions contained in the Medication Management class, as well as their definitions and activities, and the Free and Informed Consent Form (FICF).

The cross-mapping instrument was structured by the authors in a four-column format. In the first column, the protocol's actions were arranged in five thematic categories: Medication Administration, Medication Prescription, Medication Monitoring and Management, Control of the Medication Error Risk, and Medication Distribution and Storage. Such categories were determined in a joint manner by the researchers, after a detailed reading of the content of the protocol's actions and identification of their keywords. In the second column, the corresponding NIC interventions were added specifying domain, class, title of the NIC intervention and activities[9]. In the third column, the experts pointed out if they agreed or not with the mapping and described suggestions if necessary. Finally, in the fourth column, the experts classified the mapping according to the similarity and scope of the actions/interventions classified as mapped[15]: A - Identical terms - the protocol's Nursing action is identical in words and definitions to the activity proposed by the NIC; B - Similar terms - the protocol's Nursing action is comparable and similar in meaning to the activity proposed by the NIC; C - General and

broad terms - the Nursing action contained in the protocol is general and broad, that is, less specific in relation to the NIC activity; D- Detailed and specific term - the Nursing action contained in the protocol is more detailed and specific if compared to the NIC activity. Chart 1 presents examples of the four classification options of the mapping.

Chart 1 – Example of the classification options of the mapping by the experts. Belo Horizonte, MG, Brazil, 2019.

Mapping classification	NIC intervention	Protocol's Action
A - Identical terms	Medication Administration Activity: following the five "rights" of medication administration.	Following the five "rights" of medication administration.*
B - Similar terms	Medication Administration Activity: maintaining the institution's policies and procedures for accurate and safe administration of medications.	Updating standard operating procedures regarding the medication use process.
C - General and broad terms	Medication Administration Activity: monitoring vital signs and laboratory values before medication administration, when possible.	Recording all suitable monitoring parameters (vital signs, blood glucose).
D - Detailed and specific terms	Medication Prescribing Activity: consulting with physician or pharmacist, as appropriate.	Clarifying any questions under Nursing, prescriber or pharmacist supervision prior to administering the medication.

*Hypothetic example: the "identical terms" comparison was not identified in the study.

The protocol's actions and the unmapped NIC interventions were presented in separate charts, so that the experts could decide whether they agreed or not with non-correspondence, in addition to suggesting mapping alternatives.

Compilation of the answers occurred through agreement analysis to determine the need for additional rounds to obtain a consensus opinion among the group[12–14]. For this, data analysis was performed using the Microsoft Excel® software, version 2016. The Agreement Index (AI) was calculated for each mapping item [AI = NA/(NA+ND) × 100] referring to columns three and four of the instrument, with NA referring to the number of agreements and ND to the number disagreements[16]. The minimum agreement value adopted for validating the mapping (column three) and the similarity and scope analysis (column four) was 80%[15–16]. To analyze the experts' characterization, descriptive statistics was used by calculating the absolute and relative frequencies.

The study was approved by the Research Ethics Committee of the proposing institution, in accordance with the recommendations set forth in Resolution 466/2012 of the Ministry of Health.

RESULTS

In the first stage, 61 actions were identified in the safety protocol on medication prescription, use and administration of the Ministry of Health[4]. These were arranged into five thematic categories, namely: Medication Administration (n=28), Medication Prescription (n=10), Control of the Medication Error Risk (n=10), Medication Monitoring and Management (n=8), and Medication Distribution and Storage (n=5).

In the second stage,32 NIC interventions were listed[9]. In the third stage, the researchers mapped seven (21,9%) NIC interventions with 53 (86,9%) protocol's actions.

In the fourth stage, expert nurses analyzed the mapping in two rounds. All five participants were female (100,0%), four with a PhD in Nursing (80,0%) and one with a master's degree in Nursing (20,0%). The other characterizations of the experts are presented in Table 1.

Table 1 – Characteristics of the sample of expert nurses. Belo Horizonte, MG, Brazil, 2019. (n=5)

Characterization of the sample	n	%
Professional experience		
5-10 years	2	40.0
10-20 years	2	40.0
20-40 years	1	20.0
Scientific activities on the theme of patient safety and Nursing classification systems		
Publications in A1/A2/A3/B1 qualis journals	4	80.0
Presentation of papers in national or international scientific events	4	80.0
Theme in master's dissertation or PhD thesis	2	40.0

In the first round, 94.3% (n=50) of the cross-mapping obtained 100,0% agreement and 5,7% (n=3) reached 80,0% agreement, thus being considered valid by the experts. It is noteworthy that 20 protocol's actions presented correspondence with more than one NIC intervention, and the NIC interventions that had correspondence with the largest number of protocol's actions were Medication Administration (2300), Medication Management (2380) and Medication Prescribing (2390) (Table 2).

Table 2 – NIC Interventions mapped and corresponding number of protocol's actions. Belo Horizonte, MG, Brazil, 2019. (n=7)

NIC* intervention code	Title of the NIC* intervention	Number of actions mapped n (%)
2300	Medication Administration	37 (69.8)
2380	Medication Management	19 (35.8)
2390	Medication Prescribing	16 (30.2)
2314	Medication Administration: Intravenous (IV)	3 (5.7)
2395	Medication Reconciliation	3 (5.7)
2301	Medication Administration: Enteral	1 (1.9)
5616	Teaching: Prescribed Medication	1 (1.9)

*NIC = Nursing Interventions Classification

In relation to the agreement with the similarity and scope classification of the 53 protocol's actions mapped in the first round, 15 (28,3%) actions presented an agreement percentage below 80,0% and, thus, a second round was necessary.

The result of the second round showed that 60,4% (n=32) of the protocol's actions mapped obtained 80.0% agreement in relation to the similarity and scope classification, and that 39,6% (n=21) reached 100% agreement among the experts. It was verified that 56,6% (n=30) of the protocol's actions were considered more detailed and specific (D) than the NIC activities,20,8% (n=11) were classified as similar in meaning (B) and 17,0% (n=9) as broader and general (C). No action in the protocol was classified as identical to any NIC intervention/activity. It was observed that 5,7% (n=3) of the protocol's actions were mapped only with the title and definition of the NIC intervention, without correspondence with the intervention activities and, therefore, were not classified according to similarity and scope (Chart 2).

Chart 2 – Cross-mapping of the actions contained in the safety protocol on medication prescription, use and administration with the NIC interventions after the experts' analysis. Belo Horizonte, MG, Brazil, 2019.

Categories - Protocol's Actions	NIC* Code Classification
Medication Administration	2300/ 2380 A†
Performing double-check before medication administration (especially in Pediatrics, Oncology and Intensive Care Unit).	
Checking the nine "rights" in medication administration (right patient, right medication, right route, right time, right dose, right record, right action, right way, and right answer).	2300 D‖
Verifying if the patient corresponds to the name identified in the bracelet, to the name identified in the bed and to the name identified in the medical record.	2300 D‖
Knowing the patients and their allergies, checking if they are not allergic to the medication prescribed.	2300/ 2390 B‡
Washing hands before preparing and administering the medication.	2300 D‖
Verifying if the diluent (type and volume) was prescribed and if the infusion rate was established, by analyzing its compatibility with the administration route and with the medication in case of intravenous administration.	2314/ 2390 A†
Identifying in the patients what the correct connection is for the administration route prescribed in case of administration through nasogastric tube, nasoenteric tube or parenteral route.	2300/ 2380 D‖
Performing antisepsis of the application site for medication administration to be done parenterally, intravenously or through other routes.	2314 C§
Clarifying any doubts under Nursing, prescriber or pharmacist supervision prior to administering the medication.	2300/ 2390 D‖
Evaluating the compatibility of medications and medical products used in medication administration (syringes, catheters, tubes, equipment, and others) in manuals, databases for consultation or with a pharmacist.	2300 D‖
Preparing the medication at the right time and in accordance with the manufacturer's recommendations, ensuring its stability.	2300/ 2380 A†
Instructing the patient about which medication is being administered (name, color, format), reason for the indication, administration frequency, expected effects and those that require follow-up and monitoring.	2300/ 5616/ 2380/ 2390 B‡
Checking the drip rate, programming and operation of the continuous infusion pumps in case of continuous infusion medications.	2314 B‡
Instituting the double-check practice by two professionals for calculating the dilution and administration of potentially dangerous or high-surveillance medications.	2380 A†
Not administering medication in cases of vague prescriptions, such as: "do if necessary", "according to medical order" or "under medical criteria".	2300 D‖
Recording the administration time for the medication in the prescription.	2300 C§
Recording all instances related to the medications, such as delays, cancellations, shortage, patient refusal and adverse events.	2300/ 2380 C§
Checking whether the pharmaceutical form and administration route prescribed are appropriate for the patient's clinical condition.	2300/ 2380/2395 D‖
Performing medication crushing and suspension for administration through a nasogastric or nasoenteric tube, if necessary.	2301 D‖
Following the institution's protocol regarding the preparation of patients for exams or fasting that may interfere in the administration of the medication.	2300 D‖
Not administering or delaying the administration of doses without discussing such course of action with the prescriber in case of preparing patients for exams or fasting.	2380/ 2390 D‖

Chart 2 – Cont.

Categories - Protocol's Actions	NIC* Code Classification
Tailoring the medication administration schedules to the routine use already established by the patient before hospitalization, whenever possible.	2300 A†
	2380 B‡
Avoiding, as far as possible, drug-drug and drug-food interactions when performing medication scheduling.	2300/ 2380 D‖
	2390 A†
Following the institutional protocol regarding the care measures, so that there is no administration of medications suspended by the physician.	2300 D‖
Organizing a suitable location for preparing the medications, preferably without distraction sources, and that allows the professional to concentrate on the activity being performed.	2300 B‡
Taking to the location, at the medication administration time, only what is prescribed to a single patient, not using a tray containing several medications for different patients.	2300 D‖
Preparing the medication immediately before administration, unless there is a special manufacturer's recommendation for a different procedure.	2300 A†
Medication Prescribing	2390 C§
Clarifying the prescription legibility doubts directly with the prescriber.	
Paying attention to the doses written with "zero", "comma" and "point", checking the doubts regarding the desired dose with the prescriber, since they can result in doses being ten or 100 times higher than the desired.	2390 D‖
Consulting the prescriber and asking for the prescription of a metric system unit of measure in case of doubt or inaccurate measurements.	2390 B‡
Requesting more information to the prescriber in case of vague guidelines, such as "do if necessary", "according to medical order" or "under medical criteria".	2390 D‖
Following the institutional protocol regarding verification of the prescriptions during handoff.	2300 D‖
Following the Nursing prescription for the use of infusion pumps for safe medication administration.	2300 D‖
Using typed and electronic prescriptions in order to improve their readability.	2390 B‡
Prescribing medications without using abbreviations.	2390 B‡
Recording in the prescription any information considered relevant so that patient care is safe and effective.	2390 C§
Medication Monitoring and Management	2390/2380 2395 C§
Identifying, at admission, the medications used by the patient before hospitalization.	
Instructing the patient not to stay with their medications in the hospital unit, in view of the risk of using duplicate doses.	2380 D‖
Observing actions, interactions and side effects of the medications.	2380/2300 2390 C§
Recording the following in the medical record: adverse reactions, side effects or medication errors described by the patient/caregiver or observed by the team.	2300 D‖
Observing the patient carefully to identify, whenever possible, if the medication had the desired effect.	2300/ 2380 B‡
Maintaining clear communication with the patient and/or caregiver.	2380/2300 2395 C§
Recording all suitable monitoring parameters (vital signs, blood glucose).	2300/ 2380 C§

Chart 2 – Cont.

Categories - Protocol's Actions	NIC* Code Classification
Proposing a routine for internal and external transfer of patients that contemplates safety in the medication use process during the patient's transfer.	2300 D‖
Medication Distribution and Storage	2300 D‖
Maintaining in the hospitalization units only the potentially dangerous or high-surveillance medications that are strictly necessary for patient care.	
Standardizing the adequate storage and complete and clear identification of all the medications that are under the care of the Nursing team.	2300 D‖
Monitoring the temperature of the medication packaging refrigerator, daily observing the minimum and maximum temperature parameters, verifying doubts with the pharmacist.	2300 D‖
Maintaining an adequate record of the vials of medications prepared that will be stored (with handling date and time, medication concentration, and name of the person in charge of preparation and validation).	2300 D‖ 2380 A†
Returning non-administered medication leftovers to the pharmacy.	2300/ 2380 D‖
Control of the Medication Error Risk	2300 B‡
Establishing medication administration institutional protocols.	
Updating standard operating procedures regarding the medication use process.	2300 B‡
Discussing the prevention of drug interactions with the multidisciplinary team (physician, pharmacist and nutritionist).	2380/ 2390 D‖
Updating guides for the prevention of incompatibilities between drugs and medication solutions and dilution guides.	2300 D‖

*NIC = Nursing Interventions Classification ; A† = Action mapped only with the title and definition of the NIC intervention; ‡B = Similar terms; §C = General and broad terms; ‖D = Detailed and specific terms.

Chart 3 describes the 25 NIC interventions and eight protocol's actions that did not present correspondence after the experts' analysis.

Chart 3 – Unmapped NIC interventions and protocol's actions. Belo Horizonte, MG, Brazil, 2019.

Nursing Interventions Classification	Protocol
1. Analgesic Administration (2210)	1. Supervising the preparation and administration of medications carried out by nursing technicians and assistants†
2. Analgesic Administration: Intraspinal (2214)	2. Notifying the prescription errors or adverse events in the care process to the health institution's Patient Safety Center/Risk Management†
3. Anesthesia Administration (2840)	3. Preventing two patients with the same name from remaining hospitalized simultaneously in the same room or ward†
4. Controlling central venous access device (4054)	4. Identifying allergic patients differently, with a bracelet and a warning in the medical record†
5. Chemical Restraint (6430)	5. Monitoring the occurrence of errors in the activity of medication administration for patient care through indicators†
6. Chemotherapy Management (2240)	6. Providing ongoing education and training on the safe use of medications to the team members†

Chart 3 – Cont.

Nursing Interventions Classification	Protocol
7. Hormone Replacement Therapy (2280)	7. Administering the medication using a verbal order only in case of emergency, employing a double-check method for administration with a written record of the verbal order‖
8.Medication Administration: Ear (2308)	8. Prescribing medications with similar names prominently in the writing of the name section that differentiates them‡
9. Medication Administration: Eye (2310)	
10. Medication Administration: Inhalation (2311)	
11. Medication Administration: Interpleural (2302)	
12. Medication Administration: Intradermal (2312)	
13. Medication Administration: Intramuscular (IM) (2313)	
14. Medication Administration: Intraosseous (2303)	
15. Medication Administration: Intraspinal (2319)	
16. Medication Administration: Nasal (2320)	
17. Medication Administration: Oral (2304)	
18. Medication Administration: Rectal (2315)	
19. Medication Administration: Topical (2316)	
20. Medication Administration: Subcutaneous (2317)	
21. Medication Administration: Vaginal (2318)	
22. Medication Administration: Ventricular Reservoir (2307)	
23. Patient-Controlled Analgesia (PCA) Assistance (2400)	
24. Sedation Management (2260)	
25. Thrombolytic Therapy Management (4270)	

†Category – Control of the Medication Error Risk; ‡Category – Medication Administration.

DISCUSSION

Regarding the main results obtained in this study, Medication Administration was the category that concentrated the greatest number of actions identified in the protocol such as, for example, double-checking the prescriptions, verifying the "nine rights"[17], knowledge about the patient's clinical condition, and clarifying doubts. It is noteworthy that this is the stage where errors occur more frequently[1,6], therefore indicating the need for special attention by the nurse with regard to the actions herein addressed.

In this context, it is frequently observed that the nurse is far from clinical patient care, focusing more time on the managerial demands[5]. Therefore, medication preparation and administration are often performed by nursing technicians and assistants without the nurse's due supervision. Although these activities are part of these professionals' daily practice, it is understood that they require specific skills and knowledge related to action mechanisms, adequate equipment, administration routes, possible drug interactions and undesirable effects[18]. Such fact highlights the importance of the nurse's clinical supervision in order to mitigate assistance errors[19].

Another prominent category among the actions identified in the protocol refers to medication prescription. It is known that this is a critical stage in the medication process, since it represents the starting point for the subsequent stages. Thus, the technical quality of the prescription is directly

related to the occurrence of errors[20]; therefore, it is a strategic target of the Nursing team for preventive actions. A national study that analyzed 2,687 medical prescriptions in a hospital from the South of the country for a period of six months identified a total of 13,512 errors, which corresponds to a mean of five errors per prescription, with only 0.8% of the prescriptions analyzed in accordance with the current legislation[21].

In Brazil, higher-level Nursing professionals have legal support to prescribe medications that have been established in public health programs and in a routine approved by a health institution[22]. This activity is focused on primary health care, which has well-defined protocols specifying which medications can be prescribed, not extended to the hospital routines[23]. Thus, the prominence of these professionals is justified not by the act of prescribing, but by the important role in monitoring the prescriptions made by other professionals when identifying risk situations that could result in drug iatrogenesis such as illegibility or incompleteness of information[20].

With regard to the Medication Management (2380) NIC intervention, it is verified that it is prominent in the mapping for having a broad definition and contemplating activities related to monitoring the effects of the drug therapy and to the engagement of patients and family members in the medication process and in medication reconciliation[9]. Such activities, in turn, are also addressed in other mapped interventions, such as Medication Administration (2300), Medication Reconciliation (2395) and Teaching: Prescribed Medication (5616). This justifies the fact that these interventions appear concomitantly in the mapping of certain actions of the protocol.

It is to be noted that medication reconciliation is an indispensable intervention for the prevention of errors. It begins with the identification of the medications used by the patient and information such as dose, route, frequency and indication. From that, decision-making can be more assertive about which therapies must be continued, discontinued or changed, preventing the errors from reaching the patients[24–25]. In an international study, nurses were able to reduce, by 29,7% and in a 30-day period, the rate of hospital readmissions after the implementation of a work process that enabled medication reconciliation in the hospital units, which evidences the importance of the Nursing team's performance in this aspect[26].

It is also noted that only one of the protocol's actions was mapped with the Teaching: Prescribed Medication (5616) NIC intervention, which suggests a weakness in the actions related to the involvement of the patient in the medication process. It is known that the participation of these agents in care is directly related to error reduction in the drug therapy[6] and nurses play an essential role in this context. When these professionals provide assertive information and in plain language on the medication prescribed, indication, administration route, expected effects and side effects, they favor safety management in the hospital, outpatient and home environments[27]. Therefore, this intervention can support Nursing actions that will ensure preparation of the patient for the safe use of the medications prescribed, as well as monitoring their effects[9].

As for the NIC interventions related to medication administration via the intravenous and enteral routes, they were mapped for presenting correspondence with actions of the protocol referring to checking the dilution, infusion rate and route compatibility, antisepsis and crushing for the medications that are administered through tubes. It is observed that the complexity of these routes is linked to more elaborate processes for the preparation of medications, such as handling several materials, dilution calculations and programming infusion pumps, among other factors, which predispose for iatrogenesis[28].

As for the unmapped NIC interventions, such as Analgesic Administration (2210), Medication Administration: Intradermal (2312) and Intraosseous (2303), Chemotherapy Management (2240) and Sedation Management (2260), it is understood that, having the title and definition for each as a starting up point, non-correspondence is justified because they fall into very specific classes of

medications and of Nursing care measures, or administration routes that are not evidenced by the protocol. The Ministry of Health's protocol, in its turn, emphasizes prevention strategies according to the most critical and general situations for drug safety[4].

On the other hand, considering the definition and the list of activities of these interventions, it is observed that the NIC can be the basis for the elaboration of specific protocols related to the medication process, that meet the complexity inherent to the Nursing professional's duties in the health services, and that consider the provisions of the regulatory bodies for this profession in the country[12].

It is noted that the protocol's action on independent double-check (performed by two different professionals) was only mapped with the title and the definition of the following NIC interventions: Medication Administration (2300) and Medication Management (2380), finding no correspondence with the activities of these interventions. However, such a practice is evidenced as an important strategy for the prevention of medication errors and is recommended even if it is limited to opportune situations, for example, checking the medical prescription among the nurses during handoffs, as the presence of a high number of control points can lessen its impact[6]. Thus, it is understood that this action could be incorporated as an activity of one of these NIC interventions with which it was mapped.

Among the unmapped actions of the protocol, it is observed that "supervising the preparation and administration of medication carried out by nursing technicians and assistants" is related to the organizational model of the Brazilian Nursing team and, thus, correspondence with the taxonomy was not identified[22]. Also in this aspect, the "notifying the prescription errors or adverse events in the care process to the Patient Safety Center" action includes PNSP specificities that propose the implementation of tools for risk management in the country's health institutions[3].

However, other unmapped actions of the protocol are considered relevant measures by the current literature[2,5,19,29–30] and subjected to inclusion in the NIC taxonomy, such as: monitoring the occurrence of errors by means of indicators, providing permanent education and training to the team members, identifying allergic patients and prescribing medications with similar spelling, especially in the writing of the name section that differentiates them[30].

Regarding the study limitations, it is observed that the protocol's narrative and multidisciplinary structure can favor non-identification of Nursing actions that also match the research theme. In addition to that, some NIC interventions may not have been listed because they are not contemplated in the Medication Management class.

Through this study, it is expected to ensure visibility as to the involvement of the Nursing team in drug safety, as well as to evidence that most of the actions performed by these professionals on the subject matter in question can be described by means of a Nursing classification system.

It is also understood that the findings of this study instigate the development of future research studies related to the review of the NIC, so that the unmapped protocol's actions or those only mapped with the title and definition of the NIC interventions support updating of the taxonomy, since such actions are in consonance with the measures considered relevant by the current literature and can assist in the prevention of medication-related errors.

CONCLUSION

Of the 61 actions identified in the safety protocol on medication prescription, use and administration of the Ministry of Health, 53 were mapped to seven NIC interventions of the Medication Management class. After mapping validation, it was evidenced that most of the actions contemplated in the protocol were considered more detailed and specific in relation to the activities of the NIC interventions. It was also identified that the protocol presents shortage of actions related to involvement of the patient in the medication process, with only one mapped action in this context.

It was also verified that the unmapped NIC interventions refer to very specific administration routes or Nursing care measures not evidenced by the protocol such as, for example, Medication Administration: Intraosseous, Rectal, Vaginal and Intramuscular. However, these are interventions that can contribute to the elaboration of operational protocols capable of encompassing the peculiarities of the clinical Nursing practice in the different health areas and care levels.

From the results of this study, it is expected that the importance of the Nursing team's performance in the context of drug safety is evidenced, considering the diversity of actions that these professionals can execute. The findings also favor a rapid survey of the NIC standardized language interventions for the elaboration of care protocols related to drug safety. In the scope of science, the study may drive the development of research studies with methodological reproducibility related to the use of cross-mapping and the NIC. Finally, it is expected that this research supports discussions about drug safety and the use of standardized language in the professional training process.

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NOTES

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Data analysis and interpretation: Camargos RGF, Azevedo C, Mata LRF.
Discussion of the results: Moura CC, Camargos RGF, Azevedo C, Mata LRF.
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