ANALYSIS OF THE RECORDS OF DRUG PRESCRIPTIONS IN A UNIVERSITY HOSPITAL

ANÁLISE DOS REGISTROS DAS PRESCRIÇÕES MEDICAMENTOSAS EM UM HOSPITAL UNIVERSITÁRIO

ANÁLISIS DE LOS ARCHIVOS DE LAS RECETAS DE MEDICAMENTOS DE UN HOSPITAL UNIVERSITARIO

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ABSTRACT

Objective: to analyze drug prescriptions in three inpatient units of a university hospital in the State of Sergipe. **Method:** this was a descriptive, transversal, and documental study. Data were collected in inpatient units during ten days in March of 2012. The sample consisted of 286 prescriptions with 2,605 items related to drugs. The study was approved by the Ethics and Research Committee of the Federal University of Sergipe, under number CAAE 0263.0.107.000-11. **Results:** out of the total prescriptions analyzed, 48% were typed, 98% did not show the patient's record number, and 100.0% contained abbreviations and acronyms. Out of the 4,522 prescribed drugs, a prevalence in the absence of dosage form, drug name, and other data on the medication was observed. **Conclusion:** the existence of inadequacies in the records of drug prescriptions has shown that the administration of drugs in the studied institution can pose risks to patient safety, indicating the need for the implementation of corrective actions.
Keywords: Drug Prescriptions; Medication Errors; Medication Systems, Hospital.

RESUMO

Objetivo: analisar as prescrições medicamentosas em três unidades de internação de um hospital universitário no estado de Sergipe. Método: estudo descritivo, transversal e documental. Os dados foram coletados nas unidades de internação pelo período de 10 dias durante o mês de março de 2012. A amostra compreendeu 286 prescrições com 2.605 itens referentes a medicamentos. A pesquisa foi aprovada pelo Comitê de Ética e Pesquisa da Universidade Federal de Sergipe, sob o nº CAAE 0263.0.107.000-11. Resultados: do total das prescrições analisadas, 48% estavam digitadas, em 98% não constava o número do registro do paciente e 100,0% continham abreviaturas e siglas. Das 4.522 doses medicamentosas prescritas, foi observada prevalência de ausência da forma farmacêutica, nome do fármaco e outros dados relativos à medicação. Conclusão: a existência de inadequações nos registros das prescrições medicamentosas comprovou que a administração de medicamentos na instituição pode apresentar riscos à segurança do paciente, indicando a necessidade de implementar ações corretivas.
Palavras-chave: Prescrições de Medicamentos; Erros de Medicação; Sistemas de Medicação no Hospital.

RESUMEN

El objetivo del presente estudio fue analizar las recetas de los medicamentos de tres unidades de internación de un hospital universitario del Estado de Sergipe. Se trata de un estudio transversal, descriptivo y documental. Los datos fueron recogidos en las unidades de internación durante 10 días del mes de marzo de 2012. La muestra consistió en 286 recetas con 2.605 insumos relacionados con los medicamentos. Este estudio fue aprobado por el Comité de Ética de la Universidad Federal de Sergipe, bajo el nº CAAE 0263.0.107.000-11. El 48% del total de las recetas analizadas estaban digitadas, en 98% no figuraba el número de protocolo del paciente y 100,0% tenían abreviaturas y siglas. De las 4.522 dosis recetadas, se observó que prevalece la falta de la forma farmacéutica, nombre del medicamento y otros datos referentes a la medicación. La falta de adecuaciones en los archivos de las recetas de los medicamentos mostró que en este hospital la administración de medicamentos puede presentar riesgos para la seguridad del paciente, lo cual señala la necesidad de tomar medidas correctivas.
Palabras clave: Prescripciones de Medicamentos; Errores de Medicación; Sistemas de Medicación en Hospital.

INTRODUCTION

The routine of drug therapy inserted in hospitals should be understood as a practice consisted of several factors involving numerous processes that are interconnected and interdependent. The participants in this process are professional members of the medical, pharmacy, and nursing staff. Although with different assignments, each professional is involved in a common goal, which is the assistance provided to the health of patients throughout their stay in the hospital institution.[1]

The study of errors/adverse events – resulting from drug treatment and not related to the disease process – has been considered fundamental to managing the quality of patient care, driving a culture of safety and effectiveness in the health system.[2] Currently, the considerable increase in the incidence of these events draws the attention of health care managers because it threatens to become a serious health problem worldwide.[3-5]

It is known that errors in the drug administration process are important causes of morbidity and mortality among patients admitted to health institutions.[6,7] According to Cook (2004)[8], more people die due to medication errors than accidents at work.

A scholar stated that medication errors account for 35% (140,000) of all evidence-based estimate of 400,000 deaths per year due to adverse events in hospitalized patients in the US. The author also emphasizes that the most important are not the numbers but promoting a change in activities in this frustrating scenario.[9] In Brazil, an increase in challenges and concerns about medication errors is observed, with remarkable advancement of publications on the subject, which indicates in a way, an increased interest in the event on the part of hospitals in the country.[10]

Drug prescription errors are related to any fault committed during the writing of medicines and relate to dosage form, strength, route of administration, or absence of such data, as well as the use of abbreviations, frequency of an inappropriate treatment regimen, drug interactions, and performance of poor anamnesis.[11] According to the World Health Organization and because of the complexity of the analysis, incidents are classified into four groups: risk circumstances (there is significant potential for harm, but the incident does not occur); almost error (incident that does not reach the patient); incident without damage (event that occurred with the patient, but did not result in damage); incident with damage (equal to an adverse event, with damage to the patient).[12]

In this scenario, several studies observed errors at different stages of the drug administration process. Some were related to prescription/transcription of drugs, many of them associated with the difficulty in understanding the prescription's handwriting or inadequacy.[13] Others verified that most errors (72%) started during the prescribing act and were associated with knowledge deficits in pharmacotherapy or technical insufficiency.[14] Moreover, a study analyzing the phases of "preparation" and "administration" of drugs concluded that the prevalent error in the preparation phase was inadequate medication dilution, and wrong selection of patient in the administration phase.[15]

There are other factors that can favor the occurrence of errors during the drug therapy process such as lack of attention, memory lapses, deficiencies in academic or technical training, lack of experience and training, environment with low illumination and noises, frequent interruptions, inadequate number of professionals, accumulated services, miscommunication, and lack of standardization of procedures in the institution among others.[13,16]

Importantly, during this process, any action taken by a professional can compromise the actions of others, thus, registering situations that can lead to various errors and adverse events to patients.[3,17] Therefore, the assurance of safe medication administration in health care systems is complex and requires much attention from health professionals due to the multiple factors that interfere in the process. A widely publicized method for the evaluation of actions aiming at patient safety in medication administration is the use of quality indicators for the assessment of the entire process.[18]

In general, it is difficult to detect accurately the source of errors, therefore, the importance of the involvement of the nursing staff during this action should be emphasized because these professionals perform the last steps in the drug therapy process, which increases the responsibility of the team to detect possible mistakes, and thus, correct faults that occurred in previous stages.[13] It is noteworthy that all professionals involved should feel responsible for ensuring patient safety by monitoring the medication administration process.[4] Certainly, the incidence of adverse events represents only the "tip of the iceberg"[17]

The errors mentioned represent a number of risks to the health of a patient and may result in the increase of his hospital stay, leading to suffering for him and his companions. The consequences of errors also contribute to the depreciation of involved professionals and the possibility of increased costs demanded by hospital admissions.[1]

The execution of a study on medication errors in a university hospital will provide visibility to the existing problem with the deployment and implementation of preventive measures to ensure patient safety as well as teaching models. Thus, this study aimed to analyze the records about drug therapy in medical prescriptions to inpatients in the Medical Clinics I and II, and Surgery Clinic at the University Hospital (UH) in Sergipe.

MATERIAL AND METHOD

This was a descriptive, transversal, and documental study conducted in three inpatient units of the University Hospital (HU) in the municipality of Aracaju-SE. The HU is part of the

State Health network and meets the demand of the Unified Health System (SUS). The choice of the institution for the study was due to its teaching hospital status, with a key role in the formation of several categories of health professionals.

The units selected for the study were: Medical Clinic I, Medical Clinic II, and Surgery Clinic containing 20 beds each. All are home to patients from different medical specialties, with a wide variety of prescription drugs, which favored the execution of this study.

The sample consisted of all records of medical prescriptions in the patients' medical records. Thus, there was no loss of records in the study. Data collection was performed by the authors themselves during ten days in March of 2012, in afternoon and evening shifts. This period was based on the permanence rate of hospitalized patients. Thus, no sample size calculation was performed because it was decided to check all records within the stipulated period.

A script based on the research conducted by Gimenes in 2007[19] was used for reviewing the records of drug prescriptions. The information on this instrument was adapted and transferred to a new form to respond the proposed objectives of this research. The following variables were analyzed:

1. **number of items related to the medication:** only items related to drug prescription will be considered;
2. **number of prescribed doses:** consisting of the sum of all prescribed medication doses;
3. **type of prescription:** refers to the issuing as digitized, manual, or both forms of the same prescription;
4. **absence of patient data:** when, on the prescription, the correct patient identification, such as full name, registration number, bed number, and ward number are missing;[19]
5. **no date:** when the date is not specified in the prescription;[19]
6. **absence of drug data:** when the drug is not specified by name (trade name, acronyms, etc.), dosage form (vial, tablet, capsule, envelope, bottle vial, etc.), dosage, route of administration [oral (VO), enteral (VE), parenteral, intramuscular (IM), subcutaneous (SC), intradermal (ID), endovenous/intravenously (EV/IV), topical or inhalatory], dose schedule and/or correct frequency of drug administration (ex.: "2 times per day" instead of "every 12 hours");[19]
7. **record of administration time:** corresponding to the absence/error of record of administration time (ex.: use of the letters "M" for morning shift, "T" for afternoon shift, and "N" for night shift, in place of the objective determination of time) by the nursing staff, including suspensions;[19]
8. **acronyms and/or abbreviations:** when there are shortened words (abbreviations) such as NBZ for nebulization or AMP for ampoule, or the use of letters to form a term (acronym) such as IU for international units or VO or for orally;[19]

9. **alterations and/or suspension of medication use:** corresponds to alterations to one or more items in the prescription related to dosing throughout the day;[19]
10. **erasures related to the dose:** when there is information on the dose that have been scribbled and/or circled;[19]
11. **illegibility of the handwriting about the drug:** it corresponds to the difficulty in reading the name of the handwritten prescribed drug.[19]

The script used in the study for data collection is in the public domain; therefore, prior authorization from the author for using it was not required.

The data was analysed using descriptive statistics through the Microsoft Excel version 2010 program.

The project was approved by the Research Ethics Committee of the Federal University of Sergipe under number CAAE 0263.0.107.000-11 in compliance with the recommendations of Resolution No. 196/96 of the National Health Council. The project was also presented to the clinical and nursing managers of the University Hospital to inform and request their authorization to carry out the research.

RESULTS

For didactic purposes, the results are presented in subtopics in accordance with the 11 items evaluated in the data collection instrument; they were grouped according to the results in some cases.

NUMBER OF ITEMS RELATED TO MEDICATION AND NUMBER OF PRESCRIBED DOSES (ITEMS 1 AND 2)

A total of 286 prescriptions were analyzed, which contained 2.605 items related to medications and a total of 4,522 prescribed medication doses. The average drug doses per prescription was 15.8. Table 1 presents the distribution of these items according to the inpatient units.

Table 1 - Distribution of frequencies of the following variables: number of prescriptions, medication item, and prescribed doses in the medical records of Medical Clinic I, Medical Clinic II, and Surgery Clinic at the University Hospital, Federal University of Sergipe, 2012

Unit	N° of prescriptions		Medication item		Prescribed doses	
	n	%	n	%	n	%
Medical Clinic I	116	41%	1040	40%	1923	42.53%
Medical Clinic II	95	33%	914	35%	1663	37.78%
Surgery Clinic	75	26%	651	25%	936	20.70%
Total	286	100%	2605	100%	4522	100%

Prescription type (item 3)

Regarding the variable, type of prescription, a predominance of the typed form was observed in Medical Clinic I and II, with 64 (55.17%) and 65 (68.4%) records, respectively; followed by the handwritten form, with higher prevalence only in the Surgery Clinic, with 63 (84%) occurrences. Prescriptions in both forms, manual and typed, were more prevalence in Medical Clinic I with 45 (38.7%) cases; followed by 20 (21%) in Medical Clinic II, and five (6.6%) in the Surgery Clinic.

Absence of patient data (item 4 and 5)

This data evidenced that out of the total 286 records, only five (2%) contained all the proper information such as full name, registration number, and ward and bed numbers. The only often omitted variable was patient registration number in the institution, which was absent in 281 (98%) prescriptions. Only one record (0.3%) did not contain the prescription date, and two (1%) records did not mention the bed number.

Absence of drug data (item 6)

Table 2 describes the absent data related to prescribed medication; note that the most frequent items were related to the absence of dosage form (vial, tablet, bottle vial, flask) and absence of the drug name such as NPH insulin (NPH), saline (SF), dextrose (SG), nebulization (NBZ), oxygen (O_2), and the time and/or frequency of drug administration.

Table 2 - Distribution of frequencies related to the absence of drug data detected in the records of Medical Clinics I and II, and Surgery Clinic at the University Hospital, Federal University of Sergipe, 2012

Variables with absent data	Medical Clinic I		Medical Clinic II		Surgery Clinic	
	n(116)	%	n(95)	%	n(75)	%
Name of the drug	116	100%	79	83%	72	96%
Dosage form	116	100%	92	98%	73	97%
Dosage	41	35%	57	69%	36	48%
Route of administration	32	28%	37	39%	28	29%
Time/frequency of drug administration	113	97%	88	93%	57	76%

Records of administration time

The information related to the drug administration schedule was mostly complete and legible; in the items, absence or record error, the unit with the highest percentage was the Surgery Clinic, followed by Medical Clinics I and II. Regarding erasures in recorded time, despite a few instances, the highest rate of this item occurred in the prescriptions from Medical Clinic I, followed by Surgery Clinic and Medical Clinic II (Table3).

Table 3 - Distribution of frequencies according to the record of time of administration detected in the medical records from Medical Clinics I and II and Surgery Clinic at the University Hospital, Federal University of Sergipe, 2012

Record of administration time	Absence or record error		Erasures in the record	
	n	%	n	%
Medical Clinic I (n=116)	12	10%	5	4%
Medical Clinic II (n=95)	17	17%	3	3%
Surgery Clinic (n=75)	14	19%	3	4%

Acronyms and/or abbreviations

A higher frequency of information concerning acronyms and/or abbreviations in the drug was observed in the items: route of administration, dosage, dosage form, and acronyms and/or abbreviations among the main items (Table 4).

The use of acronyms and abbreviations in the name of the drug revealed the use of some that are uncommon or non-standardized, namely: SMT, TMP, HTZ, HNF, and IR. These remained without an understandable meaning in the prescriptions.

Referring to acronyms and abbreviations in the drug administration routes, and citing the most frequent, a variety of different forms was observed among the most used by public consensus such as VO, IV, IM, SC, NBZ, and SNE relative to the enteral administration route. With respect to dosage, various acronyms and/or abbreviations were found including CP (tablet), CAP (capsule), COMP (tablet), and AMP (vial). Likewise non-standardized descriptions such as SOS (drug administration if needed), ACM (at the physician's discretion), D4/12 (ex. the fourth day in the 12 days recommended for treatment), and CX (box) were observed.

Table 4 - Distribution of frequencies according to acronyms and/or abbreviations found in the medical records of Medical Clinics I and II, and Surgery Clinic at the University Hospital, Federal University of Sergipe, 2012

Acronyms/ Abbreviations	Medical Clinic I		Medical Clinic II		Surgery Clinic	
	n (116)	%	n (95)	%	n (75)	%
Drugs	78	67%	90	95%	48	64%
Administration route	116	100%	95	100%	73	97%
Dosafe form	102	88%	86	91%	59	79%
Dosage	116	100%	95	100%	73	97%
Others	114	98%	82	86%	51	47%

Alterations and/or suspension in drug use, erasures in dose information, and illegibility of the drug name (items 9,10, and 11)

Alterations and/or suspension in drug use were observed at a higher percentage at Medical Clinic I. concerning erasures in dose information and illegibility of drug name, the Surgery Clinic was the one with the highest rate (Table 5).

Table 5 - Distribution of frequencies of alterations and/or suspensions in drug use, erasures in dose information, and illegibility of the drug name detected in the medical records from Medical Clinics I and II, and Surgery Clinic at the University Hospital, Federal University of Sergipe, 2012

Analyzed variables	Medical Clinic I		Medical Clinic II		Surgery Clinic	
	n (116)	%	n (95)	%	n (75)	%
Alterations and/or suspensions of drug use	73	63%	26	27%	15	20%
Erasures in dose information	13	11%	6	6%	9	12%
Illegibility of the drug name	1	1%	1	1%	4	5%

DISCUSSION

The inadequacies in drug prescriptions evidenced in this study reveal that the process of drug therapy in the HU has weaknesses, making it an unsafe process performed by the professionals involved. This fact, prompted by the scientific community, suggest the need for actions to review and adjust the standards set by the competent organizations, leading to a medication system that becomes safe, efficient, which contributes to reducing errors and providing better quality of care in drug therapy.[13,19-21]

One of the inadequacies addressed in this study refers to the type of prescription, considering that the lack of standardization in this procedure was evident. This fact can be explained by the absence of an electronic system and established standards and protocols to guide the practice of medical professionals at the institution.

With regard to handwritten prescriptions, illegibility complicates the interpretation of data and favors the occurrence of errors and wasted time by the team.[22] According to a study conducted in four Brazilian hospitals, one of the factors identified as contributing to reducing and preventing medication errors is the abolition of handwritten records. Its substitution by an electronic prescription system provides complete and concise information that is safer.[13,23]

It is worth mentioning that there is no electronic prescription system in the HU, however, when record alterations are necessary for typed prescriptions, they are done manually, which justifies the percentage of 38.7% of prescriptions presenting both forms in Medical Clinic I, followed by 21% in Medical Clinic II, and 6.6% in the Surgery Clinic.

The patient's identification data showed the absence of the registration number as predominant in most prescriptions. Similar results were found in research in a pediatric teaching hospital where the record number of patients was absent in 41.0% of the sample.[24] It is essential that the record number and other information related to the identification requirements are specified in prescriptions because it is possible that, in the same ward, there are patients with the same name or similar names, incurring in the possibility of drug administration by the nursing staff to the wrong patient.[21, 25]

The record of a date was found in almost all analyzed prescriptions, which is a relevant and positive fact because it is information that ensures the validity of the prescription within 24 hours, allowing the analysis and evaluation about the need for treatment continuation or not within a certain period of time.[26]

It was verified that in the absence of drug data, the most often finding was related to dosage form, followed by absent drug name, and absent time and/or correct frequency of drug administration.

The absence of drug data can also interfere with the process of preparation and administration of medications. In situations like this, the integration between prescribers and nursing staff has great relevance because the role of nursing is strongly inserted into this routine. It is also extremely important that the entire team has technical skills and be updated with new knowledge on drugs and their proper administration.[27]

A study conducted in a university hospital in Fortaleza-CE with 167 prescriptions identified the absence of dosage form in 48.6% of the records. This result was repeated in 46.8% of 1,800 prescriptions analyzed in a study in a basic health unit in the municipality of Aracaju-SE. It is known that it is essential that the prescription discriminate dosage form (for example tablet, ampoule, capsule, envelope, among others). This prevents that the professional responsible for this stage have any questions or prepare and administer the drug incorrectly.[21, 28]

The absence of information about the route of administration revealed the prevalence of 24.2% in a study conducted in a pediatric unit. The high prevalence of the absence of this information may predispose the administration of medication through the wrong route. Similarly, it is important that the scheme for the administration to be individualized, including clear and correct information about frequency and treatment time.[19,26]

The records about drug administration time by the nursing staff revealed that in most cases they were complete and legible. In tune, a research conducted in five Brazilian hospitals with a total of 1,084 analyzed prescriptions showed that the re-

cords of administration times were incomplete (7.8%), erased (4.8%), and illegible (2.1%).[6] It is noteworthy that prescription omission or error can lead to problems for the nursing staff in calculating dose or dose omission, which can cause iatrogenic reactions to patients or treatment inefficiency.[3,24]

A positive finding in the study was the low frequency of illegibility and erasures in items related to a medication when compared to other studies. In a study conducted in three in-patient units, the predominance of 73% of illegible items out of a total of 808 records was evident. Such irregularities are considered a risk to patient safety because they may lead to confusion in the information contained in the prescription. The subjectivity in the evaluation of this data causes difficulty in its measurement, given that much depends on both individual and environmental factors.[26]

In this light, the Brazilian legislation establishes that hospital prescriptions must be legible and complete, containing drug name, route of administration, legible signature, prescribing physician registry number, complete patient information, and current date.[29]

Although the administration of drugs is a routine and even a mechanical act, misguided actions causing errors are possible. This can start from incomplete and illegible prescriptions, incorrect drug dispensing by the pharmacy service, or overload nursing team tasks; the latter may favor the non-observance of the "five rights", which, when used assiduously allow for a reduction in errors in the administration of drugs.[30] In order to increase safety in medication administration, studies mention checking the "nine rights" namely: right medication, right patient, right dose, right route, right time, right record, right action, right dosage form, and right monitoring.[31,32]

Conversely, we must consider the need for an effective communication process between all involved professionals, an attitude that ensures increased patient safety during drug therapy. When this practice is ineffective, it can result in errors and possible delays in patient recovery.[24]

Regarding the use of acronyms or abbreviations in medical prescriptions, it should be noted that there is no standardization of these variables in the institution under study, which led to the significant sample of results found in all prescriptions using abbreviations for drug name, route of administration, dosage form, and dosage among others.

In an article published on the use of abbreviations, the authors state that it can lead to errors because the difficulty in reading can be misinterpreted, and its use should be restricted to standard hospital abbreviations. Contrary to this position, some authors argue that one should avoid the use of abbreviations for dosage forms citing a few examples such as "comp" for tablets, "amp" for ampoules and the like, route of administration (VO for oral or IV for intravenous, etc.), quantities (such as a box, cx), and mainly about units of measurement such as IU for international units.[21, 26]

This kind of language can lead to medication errors due to the fact that some professionals do not have familiarity with their meanings, or even in the case of units that can be confused in reading, causing inaccurate dosing administered with possibly fatal consequences.[19, 21]

Alterations or suspension in the use of drugs was another issue raised by this study because they were identified at high frequencies in the evaluated prescriptions. Importantly, making some alterations and/or suspending prescriptions due to the lack of some medications or adverse drug reactions are often necessary. Although this study did not evaluate whether or not formal communication regarding the change in prescriptions, studies show that often the lack of effective communication during these modifications towards the nursing staff can result in errors and cause irreversible damage to the patient's health.[19, 20, 22]

Errors can be committed by any professional during any stage of this process, and their causes are multiple. The study by MacLeod et al. (2015)[27] is cited as an example wherein high average interruptions and distractions for hours were identified during the medication process including medication errors as consequences. Thus, the establishment of barriers against these events is suggested: optimization of medication systems; management of interruptions and distractions during the preparation and administration of drugs; and patient involvement in his drug therapy.

However, the prevention of errors occurs through the efforts of the entire interdisciplinary team, before and during the use of medication, as well as during the evaluation of its effects.[27] One of the recommended practices is the systematic verification of skills to reduce errors in the medication process. This action improves both the theoretical and practical skills of all professionals involved.[32]

One of the limitations of this study was the small number of collection days because a larger sample could provide different findings although there is not a high turnover of prescribers and patients in the studied units. Another limitation is that only records related to drug therapy prescriptions were analyzed. Therefore, it was not possible to verify whether there were problems with legibility and prescription content or with an incorrect selection of drug. Hence, other types of studies would be necessary to answer these questions.

CONCLUSION

Based on the results presented, it is noted that the prescription of medications in the studied site proved to be fragile, with risks to patient safety, and in need of an urgent implementation of preventive and corrective measures to be followed by all professionals involved in the drug therapy process, thereby

ensuring, quality care.Because the responsibility of drug therapy is multidisciplinary, it is necessary that prescription is not seen just as a document, but also as an instrument of communication between professionals, reducing errors and making drug therapy a safe practice.

Therefore, the need for creating institutional norms and protocols, education activities in the service, and measures for the awareness of prescribers on the importance of a completed prescription is observed.

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