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Dispensation errors in hospital pharmacy

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Abstract. Medication errors represent a major health system problem in all countries, reducing patient safety and increasing health-related costs. Among the various types of medication errors, we can mention dispensing errors. They are related to the activity of the hospital pharmacy and can cause serious consequences for the patient. The aim of this study was to conduct a bibliographic search in online databases on medication errors that occurred in the hospital environment during dispensation, identifying the causes and strategies to reduce such errors. The main dispensing errors observed were content and labeling errors. The main causes associated with errors were: lack of knowledge on the part of the team, excessive working hours, interruptions and distractions, similarity in the names, labels and packaging of medicines, absence of double checking and reduction of the pharmacist's assistance activity. Based on the identification of causes, strategies related to communication, working conditions and the environment, information on medicines and the packaging and labeling of medicines were described in order to reduce dispensing errors.
Keywords: Hospital pharmacy, Medication errors, Dispensing errors.

Introduction

The Pharmacy Service is responsible for the safe and effective use of medicines in the hospital, playing a key role in the integration of prescription, dispensing and administration processes (COSTA, VALLI, ALVARENGA, 2008). Thus, the organization of the pharmacy and the pharmaceutical practice must prevent dispensing errors occur (ANACLETO, PERINI, ROSA, 2007). It is necessary to maintain an effective hospital distribution system to ensure that the patient receives the medications according to the medical prescription (RIBEIRO, 2013) and has policies and procedures that prevent errors (COSTA, VALLI, ALVARENGA, 2008).

Medication error is defined as any preventable event that, in fact or potentially, could lead to inappropriate use of medication when the medication is under the control of health professionals or the patient, which may or may not cause harm to the patient (ANVISA , 2013).

Among medication errors are errors related to dispensing (ARONSON, 2009). These are defined as errors by pharmacy staff, including pharmaceuticals when carrying the dispensing of drugs for hospital units (ASHP 1993).

The occurrence of medication errors increases health costs and negatively contributes to patient safety (JOOLAEE et al., 2011). In addition, it is likely that many medication errors are undetected and have minimal sequelae and clinical significance, without adverse consequences for the patient. However, many errors cause serious consequences (ANACLETO, PERINI, ROSA, 2007) which justifies a better knowledge of dispensing errors, their causes and strategies to reduce them, promoting increased patient safety and reducing associated costs errors.

Therefore, the present study aims to conduct a bibliographic search on errors related to dispensing in the hospital environment, pointing out the causes associated with such errors and the strategies for reduction.

Methods

A review was conducted by consulting the following databases: Medical Literature Analysis and Retrieval System online (Medline), Scientific Electronic Library Online (Scielo), Bireme and Latin American and Caribbean Literature in Health Sciences (LILACS). We opted preferentially for articles from the last 10 years, in Portuguese and

English, with full online content without, however, excluding articles of interest that might be in Spanish and French. The following descriptors were used: “Hospital pharmacy”. “Medication errors” and “Dispensing errors”.

The publications were selected after reading the title and abstract, checking the existence or not of information on the proposed theme, excluding those that did not meet the established criteria or the objective of this study.

After a critical reading of the selected articles with the necessary impartiality and objectivity, seeking answers to the research objectives, an interpretative reading was carried out, relating the information and ideas of the authors to the guiding questions and the problems for which solutions are sought. After the readings were carried out, the data were organized and an analysis text of the represented data was prepared, in the form of an article, based on the proposed objectives.

Medication errors

Medication errors represent a major health system problem in all countries. In the United States of America at least 1.5 million people suffer from medication errors annually (WHO, 2008). In 2006, it was estimated that 30% of the damages during hospitalization in the United States of America were associated with medication errors, causing serious economic consequences for health institutions. The annual cost of morbidity and mortality related to medication errors is around US $ 76.6 billion (MIASSO et al., 2006). In Brazil, death statistics related to medication errors are not yet available, according to the Safety Protocol on Prescription, Use and Administration of Medicines published by the National Health Surveillance Agency – Agência Nacional de Vigilância Sanitária - ANVISA (ANVISA, 2013).

Medication errors can be defined as a failure in the treatment process that causes or can cause damage to the patient (FERNER, ARONSON, 2006; ARONSON, 2009). Being considered as a treatment process the use of the drug for the symptomatic treatment or the causes of the symptoms, for investigation or physiological changes.

ANVISA defines medication error as any preventable event that, in fact or potentially, could lead to inappropriate use of medication when the medication is under the control of health professionals or the patient, which may or may not cause harm to the patient. (ANVISA, 2013).

Medication errors can occur during prescription, handling, dispensing, administration and monitoring (ARONSON, 2009). These different situations are described below:

• During prescription - No prescription of necessary medication, prescription of unnecessary medication, illegible prescription.

• Handling the formulation for use - incorrect concentration, adulteration, contaminants, incorrect packaging or exchange.

• Dispensing - Incorrect medication, incorrect formulation, incorrect pharmaceutical form, incorrect label.

• Drug administration - Incorrect dose, incorrect route, incorrect frequency, incorrect patient.

• Monitoring of drug therapy - No change in therapy when necessary, change in therapy in undue circumstances (ARONSON, 2009).

A multicenter Spanish study involving six hospitals showed that in a total of 1984 medication errors, dispensing errors were more expressive, representing 48% (n = 952) of errors. Transcription errors represented 27% (n = 535), prescription errors 16% (n = 317) and administration errors 9% (n = 178) (PASTÓ-CARDONA et al., 2009). The rate of dispensing errors is able to demonstrate the weakness in the work process and indicate the risk of serious accidents (ANACLETO et al., 2010).

Since one of the main objectives of the hospital pharmacy is to contribute to the health care process, aiming to improve the quality of care provided to the patient, promoting the safe and rational use of medicines and health products (SBRAFH, 2008), the correct dispensing medicines in the hospital environment favors the safe and rational use of medicines.

Drug distribution systems

The implementation of a rational distribution system should be prioritized by the pharmacist and the Institution, in order to seek processes that promote greater safety for the patient (SBRAFH, 2008). Drug delivery systems are divided into traditional and modern. In the traditional distribution system there are the systems: collective, individualized and mixed. The modern system refers to the unit dose distribution system (RIBEIRO, 1993).

In the collective system, medicines are kept in nursing units under the responsibility of the nurse in charge, forming mini-stocks. The replacement of medications is made periodically, on behalf of the unit, through a request sent to the pharmacy. The main disadvantages of this system are low inventory control, the occurrence of deviations and losses and medication errors (RIBEIRO, 1993).

In the individualized system, medicines are dispensed on behalf of the patient by the pharmacy to the nursing units. The requisition can be carried out by the copy of the prescription being called direct or by the transcription of the prescription being called indirect. In this system, deviations and losses are reduced and inventory control increases, but among the disadvantages are spending on human and material resources, increasing the time needed for dispensing and especially medication errors (RIBEIRO, 1993).

The mixed system combines in the same hospital the two systems described above (RIBEIRO, 1993).

In the unit dose distribution system, the drugs are contained in unit dose packages and are administered directly to the patient, requiring no

previous handling by the nursing staff. Only the drugs needed to provide 24 hours of treatment for the patient can be found in the nursing units. In this system, the pharmacy must maintain the pharmacotherapeutic record of each patient so that the pharmacist can evaluate the drug therapy (RIBEIRO, 1993).

The unit dose distribution system has a high implementation cost and requires a greater amount of human resources. However, it is able to reduce the incidence of medication errors, losses and deviations and improve the use of the professionals involved, contributing to the assistance to hospitalized patients (RIBEIRO, 1993).

The reduction of errors in this system is mainly due to the increase in the checking steps. The double check carried out by pharmacy assistants and pharmacists and later by nursing staff during receipt and before administration favors the identification of errors (ANACLETO, PERINI, ROSA, 2007).

Errors related to dispensation

According to the American Pharmacists Association, errors are defined as errors made by pharmacy employees, including pharmacists, when re

they provide the dispensing of medications to the inpatient units (COHEN, 2006), that is, any deviation between the dispensed medication and that prescribed in the medical prescription (COSTA, VALLI, ALVARENGA, 2008).

These errors can be classified as preventable and inevitable. Avoidable ones are detected before the drug is released by the pharmacy. The inevitable are detected after the medication is administered to the patient, and the medication has been dispensed by the pharmacy (JAMES et al., 2009).

Dispensing errors can be didactically classified as content errors, labeling errors and documentation errors. These can still be subdivided into categories, as detailed below. (BESO, FRANKLIN, BARBER, 2005; RISSATO, 2012; SOUZA,2018).

Content errors refer to the drugs that are being dispensed, that is, the content of the dispensation. Are they:

• Incorrect medication: Dispensed medication does not correspond to the prescribed medication.

• Correct medication in incorrect dose: Medication dispensed in a different dose than the one requested. A higher or lower than prescribed dose may be dispensed, representing a risk of ineffectiveness or toxicity, respectively.

• Correct medication in incorrect pharmaceutical form: Dispensed pharmaceutical form is not the requested form. Being able to induce the professional responsible for administration to use the wrong way.

• Error in the number of doses: The medication is dispensed in an amount higher or lower than requested.

• Omission of medication: Requested medication is not dispensed.

• Deviation in quality of the medication: Medication dispensed with deviation in quality. Associated with conservation outside the required quality parameters or expired validity. (BESO, FRANKLIN, BARBER, 2005; RISSATO, 2012).

Labeling errors are related to the labels of medications that may raise doubts at the time of dispensing and administration. In these cases, the product's own labels as well as those made in the hospital pharmacy are considered. Subdivided into:

• Incorrect patient name: As well as bed identification. Promotes drug administration to the wrong patient.

• Incorrect drug name: Drug incorrectly labeled with a name that does not match the content.

• Incorrect dose: Dose indicated on the label does not correspond to the dose present in the medicine.

• Incorrect dosage form: Dosage form is not correctly identified on the label.

• Incorrect date: Incorrect expiration or manufacturing date. It can lead the patient to use a medication with compromised stability.

• Incorrect instructions: The instructions on the label are wrong or insufficient for correct administration. (BESO, FRANKLIN, BARBER, 2005; RISSATO, 2012).

Documentation errors are related to the absence or incorrect records of the dispensation. Being them:

• Records of controlled drugs.

• Prescription date records. (BESO, FRANKLIN, BARBER, 2005; RISSATO, 2012).

In addition, incorrect dispensing times and unsolicited medication delivery are also considered as dispensing errors. (ASHP, 1993).

In a study carried out in France in 2007, in a total of 179 medication errors identified in two months, the main dispensing errors found were 31.8% (n = 57) related to the wrong dose, 30.2% (n = 54) associated with missed doses and 20.7% (n = 37) related to incorrect time. Of the total errors, 155 (86.6%) were noticed in the pharmacy itself, before dispensing to the units (BOHAND et al. 2009).

A study carried out in London indicated the final checking of dispensed items as a way to reduce dispensing errors. It was demonstrated that in a total of 4849 items dispensed, 104 items (2.1%) with at least one dispensing error. Mainly related to content and labeling errors. The workload, working conditions such as distraction, interruption and working conditions and the design of medicines such as the similarity of packaging and name were the main causes associated with errors (BESO, FRANKLIN, BARBER, 2005).

In the national context, a study carried out in Espírito Santo showed that out of a total of 2620 doses dispensed, 300 (11.5%) had a dispensing error. Of these 87.3% (n = 262) were content errors, with the main underdoses, overdoses and omissions, 11.0% (n = 33) were labeling errors and 1.7% (n = 5) documentation errors . As causes for

these errors, the lack of constant double checking and the overlapping of administrative activities are indicated by the assistance of the pharmacist (COSTA, VALLI, ALVARENGA, 2008).

The omission of dose, the wrong dose and the dispensing of the incorrect medication were identified as the main causes of dispensing errors in another national study carried out in Belo Horizonte. In this, a total of 422 prescriptions were analyzed, totaling 2143 dispensed drugs. The total number of drugs dispensed with at least one error was 719 (33.6%). Another relevant point of the study was the establishment of a causal relationship between dispensing errors and prescription errors through the observation that 13.3% (n = 96) of the wrong dispensed drugs had been prescribed with at least 1 error (ANACLETO et al., 2007).

A study carried out in a hospital in Paraná showed that in a total of 259 prescriptions, dispensing errors occurred in 19% (n = 48) of the prescriptions served. The main dispensing errors described were omission, dispensing of non-prescribed medication, incorrect concentration and incorrect dose. The associated causes were communication problems such as illegibility of prescriptions, incomplete prescriptions and similarity of labels, packaging and names. Problems related to the work environment such as overload, lack of supervision, interruptions and distractions, in addition to tiredness and lack of knowledge regarding the medication (RISSATO, 2012).

A multicenter study carried out in four university hospitals in Brazilian cities indicated equally high rates of errors associated with prescription, but variable frequencies of dispensing errors. In reef the rate of dispensing errors was 4.9%, in Goiânia 12.9%, in São Paulo 19.5% and in Ribeirão Preto 30.2%. Being mainly errors of dose and pharmaceutical form. Having as main causes the distraction, the conditions of the work environment, the difficulty of understanding the requested medication and the similarity between the different medication packages (MIASSO et al., 2006).

The absence of checking the dispensed medicines, the interpretation of prescriptions that are difficult to understand without confirmation with the prescriber, the presence of sources of distraction and constant interruptions during the execution of the activity are among the main causes of dispensing errors (ANACLETO et al. , 2007).

The methodological particularities of the various studies make it difficult to establish direct comparisons between them. However, it is possible to observe that Brazilian studies have proportions of dispensing errors similar to those reported in Europe and the United States in the late 90s. Technical advances have made it possible to reduce the rates of dispensing errors in Europe and the United States in the days current. Indicating that the implementation of communication, organization and dispensation strategies can reduce errors in Brazil (Chueng et al., 2009).

For solutions to be proposed, the causes of errors must be identified and understood. Through the studies shown above, it was possible to identify the main causes pointed out by them. They fit into the groups: communication failure, problems related to packaging and labeling, working conditions and environment and medication information (ANACLETO et al., 2005).

Communication failures are related to confusing, ambiguous or incomplete prescription, illegible prescription. Problems related to packaging or labeling are associated with the similarity of color, size, shape and name of the drug in addition to the characteristics of the package. Working and environmental conditions are related to inadequate space, lighting and temperature, workload and reduced dispensing time. Information on medicines is associated with the use of outdated information, lack of health professionals and the patient's lack of knowledge about the medicine (ANACLETO et al., 2005).

Based on the main causes indicated by the studies shown above, strategies are aimed at reducing dispensing errors.

Problems related to communication

Failure to understand what was requested by the medical prescription or nursing transcription can induce the error of the professional responsible for the separation of the drugs. Therefore, the initial stage of dispensing should be the analysis of the prescription by the pharmacist and, in case of doubt, the request for confirmation with the prescriber (ANVISA, 2013 DE MELO ALVES, 2020).

For cases associated with illegible letters, a possible mechanism for solving this problem is the use of electronic prescription. A study carried out in São Paulo points to this technique as a major advance among the strategies used to minimize errors resulting from poorly formulated prescriptions (CASSIANI, FREIRE, GIMENES, 2003).

In addition, the use of communication vehicles such as posters, crafts and passage book accessible to all employees, using clear, objective and appropriate language for each information prevents communication failures reducing opportunities for errors (ANACLETO, PERINI, ROSA, 2007).

Problems relating to the packaging or labeling

The existence of similar drug names is one of the most common causes of medication errors and is of concern worldwide. The similarity in the spelling or sound of the drug name, packaging or similar labels, incomplete knowledge of drug names and constant product launches can result in dispensing errors (WHO, 2007; SIRTOLI, 2018).

The National Coordinating Council for Medications Error Reporting and Preventing (NCCMERP) published in 2005 recommendations to increase the accuracy of drug dispensing, among which we have that products must be arranged in a way that is easily differentiated from each other. This

includes the use of visual markers and signs. Being particularly important when there are confusions between similarity of labels, concentration and similar names (MAIA, 2019).

In 2011, the Institute for safe Medication Practices and the Food and drug administration proposed for the identification of medicines with similar spelling and sounds, the use of writing part of the name of the medicine in capital letters and in bold, highlighting the difference between similar names , such as: **DOBUT**amine and **DOP**amine.

Reading the label at least three times when the medication is being separated, packaged or returned to the shelf prevents excessive practice and consequent self-confidence to allow the employee to separate the medications automatically, without paying due attention to the activity he is performing (NNCMERP, 2011; VILELA, 2019).

In addition, teaching about similar drugs should be incorporated into the teaching curricula and continuously guiding and developing professionals so that they are aware of the risks associated with dispensing these drugs in particular. Emphasize the characteristics that differentiate the drugs from each other, especially in relation to potentially dangerous drugs, that is, those that present the greatest risk of injuring the patient when there are failures in use (WHO, 2007; ANACLETO, PERINI, ROSA, 2007).

Another important consideration refers to double checking, this represents a strategy to prevent errors from leaving the hospital pharmacy and reaching the sectors responsible for administering the medication. In this process, there is a confrontation between the prescription and the drugs already separated. Greater attention should be paid to drugs with similar names or packaging, especially for potentially dangerous drugs (ANVISA, 2013).

Working conditions and environment

The dispensing area must be developed to prevent errors while maintaining an optimal workflow. (ANACLETO, PERINI, ROSA, 2007) It must be developed in a way that reduces the fatigue related to the environment such as adequate lighting, air conditioning, reduced noise and ergonomic equipment. Distractions should be minimized, such as telephone, interruption, clutter and non-work-related tasks. In addition, sufficient human resources must be provided to carry out the activities (NNCMERP, 2011).

Fatigue is a factor associated with adverse events, risk to the patient and the team and contributes to factors such as irritability, demotivation and increased time required for processing information. Being indicated to solve such an issue, allow employees to participate in the elaboration of their work schedules and to enjoy short naps of maximum 45 minutes (JCAHO, 2011).

Drug information

In 2006, the World Health Organization (WHO) established the characteristics of the seven-star pharmacist included the ability to be a permanent student. In this way, you must constantly update your knowledge to contribute to better pharmaceutical assistance and provide innovative scientific information to the public and to other professionals, contributing to the advancement of health.

The emergence of new medical technologies and new medicines requires health professionals to constantly retrain. The promotion of periodic training for employees aiming at training and encouraging work, which enables integration among professionals and creates an environment conducive to safe practices (ANACLETO, PERINI, ROSA, 2007).

Improve communication standards that facilitate the transfer and access to information related to medicines. Even patients should be informed about therapeutic treatment, as the well-informed patient can be an ally in preventing a dispensing error from becoming an administration error (ANACLETO, PERINI, ROSA, 2007).

Authors should not repeat results in the form of text, graphics, tables and figures. Choose the best option for demonstrating your work data.

Conclusion

The resolution of a problem becomes possible when its causes are recognized and solved. Thus, the identification of the causes of medication dispensing errors enables the development of strategies that minimize such errors.

Thus, depending on the profile of the hospital, the pharmacist, who plays a key role in this process, will be able to implement the strategies proposed in order to reduce dispensing errors, increasing patient safety, the quality of care provided and the credibility of the healthcare service. pharmacy in front of the hospital.

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