

HIGH-ALERT MEDICATIONS: FREQUENCY AND DOUBLE CHECKING IN A TEACHING HOSPITAL

MEDICAMENTOS DE ALTA VIGILÂNCIA: FREQUÊNCIA E DUPLA CHECAGEM EM UM HOSPITAL DE ENSINO

MEDICAMENTOS DE ALTA VIGILÂNCIA: FRECUENCIA Y DOBLE CHEQUEO EM UM HOSPITAL DE ENSEÑANZA

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ABSTRACT

Objective: To identify the frequency of prescribed high-alert medications and double checking. **Method:** Cross-sectional, documentary study, with quantitative approach, carried out in a public teaching hospital, in Southeastern Brazil. **Results:** The sample consisted of 168 medical prescriptions of patients hospitalized in adult hospitalization units. The unit that presented the highest number of high-alert medications prescribed was the first aid, 30 (83.3%). Antithrombotics corresponded to the most frequent medication class in prescriptions, present in 101 (60.1%), followed by insulins with 63 (37.5%). Double checking was performed more frequently on the following drugs: antithrombotic, 22 (21.7%) and sedatives, 6 (27.3%). **Conclusion:** It is hoped that this work will encourage the development of research on this topic and the improvement of strategies with the purpose of encouraging the effective implementation of double checking, which will promote a safe and higher quality care.

Descriptors: Medication errors; Patient safety; Nursing care; Prescriptions.

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RESUMO

Objetivo: Identificar a frequência de medicamentos de alta vigilância prescritos e a realização da dupla checagem. **Método:** Estudo transversal, documental, com abordagem quantitativa, realizado em um hospital público de ensino, do Sudeste do Brasil. **Resultados:** A amostra foi constituída por 168 prescrições médicas de pacientes internados em unidades de internação adulto. A unidade que apresentou o maior número de medicamentos de alta vigilância prescritos foi o pronto socorro, 30 (83,3%). Os antitrombóticos corresponderam à classe medicamentosa de maior frequência nas prescrições, presentes em 101 (60,1%), seguido das insulinas com 63 (37,5%). A dupla checagem foi realizada com maior frequência nos seguintes medicamentos: antitrombóticos, 22 (21,7%) e sedativos, 6 (27,3%). **Conclusão:** Espera-se que este trabalho incentive o desenvolvimento de pesquisas acerca de tal tema e o aprimoramento de estratégias com o intuito de incentivar a efetiva implantação da dupla checagem, a qual promoverá um cuidado seguro e de maior qualidade.

Descritores: Erros de medicação; Segurança do paciente; Cuidados de enfermagem; Prescrições.

RESUMEN

Objetivo: Identificar la frecuencia de medicamentos de alta vigilancia prescritos y la realización del doble cheque. **Método:** Estudio transversal, documental, abordaje cuantitativo, realizado en un hospital público de enseñanza, del Sudeste de Brasil. **Resultados:** La muestra fue constituida por 168 prescripciones médicas de pacientes internados en unidades de internación adulta. La unidad que presentó el mayor número de medicamentos de alta vigilancia prescritos fue el socorro, 30 (83,3%). Los antitrombóticos correspondieron a la clase medicamentosa de mayor frecuencia en las prescripciones, presentes en 101 (60,1%), seguido de las insulinas, 63 (37,5%). El doble cheque se realizó con mayor frecuencia en los siguientes medicamentos: antitrombóticos, 22 (21,7%) y sedantes, 6 (27,3%). **Conclusión:** Se espera que este trabajo incentive el desarrollo de investigaciones sobre este tema y el perfeccionamiento de estrategias con el fin de incentivar la efectiva implantación del doble chequeo, la cual promoverá un cuidado seguro y de mayor calidad.

Descriptor: Errores de medicación; Seguridad del paciente; Cuidados de enfermería; recetas.

INTRODUCTION

At the end of the 90s, it was possible to identify the high incidence of adverse events (AE) in hospitals from the

publication of the report *Institute of Medicine (IOM), To Err is Human: Building a Safer Health Care System*. This work led to a global impact, because it identified around 44.000-98.000 thousand cases of deaths due to the AE, which

contributed to the economic losses.¹ AE cause damage and have an incidence of 10.2% of hospital admissions in ten years.²

Faced with such evidence, it was created, in 2004, the World Alliance for Patient Safety through the World Health Organization (WHO) in order to improve care models, aiming to ensure patient safety. In 2013, WHO establishes the "Six International Patient Safety Goals" in conjunction with the Ordinance No. 529/2013 of the Ministry of Health, which establishes the National Patient Safety Program (PNSP). Among these goals, it is included: customer identification and the safe use of medications.³

EA related to drug administration are the most trivial, with their complications being preventable or avoidable.⁴ Thus, in order to prevent errors, the Institute for Safe Medication Practices - ISMP recommends the implementation of safety barriers with regard the management of high-alert medications (HAM), which are defined as those who are at increased risk of causing significant damage, permanent or death to customers due to flaws in the use process.⁵

The errors related to the use of HAM may occur during the prescribing, dispensing, transcription, preparation and /

or administration process. In addition, flaws in this process require quick interventions to ensure care free of damages.⁶ Thus, in order to address the shortcomings of the health system as it relates to the administration of drugs, it is necessary adopt a set of measures to prevent the error during medical practice associated with safety barriers.⁷

As a safety barrier, one can mention the implementation of the nine rights related to medication administration, which provide accuracy to care⁸ and constitutes one of the main strategies to prevent the AE during the preparation and administration of a drug. In addition to this, there is a double checking, strategy also created to ensure safety in medication administration and avoid errors.⁴

Double checking constitutes the conference proceedings twice for the same professional, at different times, or by two professionals.⁵ Faced with the repercussions caused by errors in preparation and administration of the HAM, it is necessary to encourage their implementation in Brazilian hospital institutions.⁹

The effective implementation of the double checking is faced with obstacles arising from difficulties in the daily

activities of professionals, such as nurses reduced number, thus causing heavy workloads.¹⁰ In this context, this study has as hypothesis or question the following: what is the frequency of HAM in medical prescriptions? What medications are double checked?

The objective of this study is: to identify the HAM frequency prescribed and verify the actual completion of the double checking by nurses in a public teaching hospital, in southeastern Brazil.

METHODS

This is a cross-sectional, documentary study, with a quantitative data analysis.

Data collection was conducted between August and November 2016 in a teaching hospital, located in southeastern Brazil, which offers high complexity assistance to 27 municipalities.

Data were obtained by means of a simple tool, checklist type, developed by the researchers for this study, which allowed to verify the frequency and type of HAM prescribed, as well as double checking of them. The requirements were consulted in the following adult hospitalization units: ER, neurology,

orthopedics, adult intensive care unit (ICU-A), coronary intensive care unit (ICU-C) unit of parasitic infectious diseases (UDIP), gynecology and obstetrics (GO), medical and surgical clinic and oncology and hematology.

In the institution under study, the register of the double checking is standardized at the time of medication preparation and administration, by the nursing staff. It was considered double checking the presence of the registration of such a procedure, the medical prescription or the annotation in the nursing record, by two professionals.

Inclusion criteria were medical prescriptions of clients hospitalized in the period from August to November 2016. The prescriptions of pediatric and neonatal patients were excluded from the study. The sampling was non-probabilistic, convenience type, totaling 168 prescriptions in the period established for the collection.

The pilot study with 10 medical prescriptions was performed in order to adjust and adapt the data collection instrument to meet the objective proposed by this study. These data were excluded from the results presented.

A database was built with the encodings of the study variables and also a dictionary (codebook) with the description of each variable. After collection, the data were entered into a spreadsheet Excel® program for Windows XP®, validated by double entry (typing), being exported to the Statistical Package for Social Sciences (SPSS) version 18.0 for processing and analysis.

The qualitative variables were analyzed using descriptive statistics, by absolute and percentage frequency distribution, whereas, for quantitative variables, the descriptive measurements of centrality (mean) and dispersion (standard deviation, minimum and maximum values) were used.

This study followed the ethical standards for research involving humans, according to Resolution No. 466/2012 of the National Health Council, was submitted to the Research Ethics Committee (CEP) and was approved by

Opinion No. 1,501,916, April 14 2016. It was asked a waiver of the Informed Consent and Informed form (ICF), because data were consolidated, arising from auditing and justified because it is a work with minimal risk of confidentiality loss.

RESULTS

Analysis consisted of 168 prescriptions, of which 135 (80%) had at least one HAM prescribed. The HAM list used as a reference for the study corresponds to the Pharmaco-Therapeutic Manual, institutional document adopted by the hospital target of this study.¹¹

The unit with the highest number of prescriptions, with at least one HAM prescribed was the ER. Of the 36 prescriptions analyzed at the unit, 30 (83.3%) had at least one HAM. Table 1 shows the frequency of HAM in medical prescriptions per unit.

Table 1. Presence of High-alert medications (HAM) in medical prescriptions per unit. Uberaba-MG, November 2016. (N=168).

Unity	HAM		HAM		Total
	Present		Absent		
	(n)	(%)	(n)	(%)	
Oncology and Hematology	3	75	1	25	4
Neurology	12	92.3	1	7.6	13

Infectious and Parasitic Diseases Unit	5	55.5	4	44.4	9
Orthopedics	14	100	0	0	14
Medical clinic	25	86.2	4	13.7	29
Intensive Care Unit - Adult	8	100	0	0	8
Intensive Care Unit - Coronary	8	100	0	0	8
Surgical Clinic	27	81.8	6	18.1	33
Gynecology and Obstetrics	3	21.4	11	78.5	14
Emergency - Adult	30	83.3	6	16.6	36
Total	135	80.3	33	19.6	100/168

by insulin, 63 (37.5%), as shown in Table 2.

One can see that it has been prescribed HAM of different drug classes. Regarding the type of HAM with higher frequency on prescriptions, it was emphasized the class of antithrombotic 101 (60.1%), followed

It was observed that the realization of the most frequent HAM double checking were: chemotherapeutic 1 (100%), inhalational anesthetics and EV 1 (33%), 6 EV sedatives (27.3%) and antithrombotic 101 (21.7%) as shown in Table 2 below.

Table 2. Frequency of High-Alert Medications (HAM) by drug class and double checking. Uberaba-MG, November, 2016. (N=168)

	Frequency (n)	Percentage (%)	Double checking	
			Yes	No
Antithrombotics (anticoagulants)	101	60.1	22 (21.7%)	79 (78.2%)
insulins	63	37.5	2 (3.8%)	61 (96.2%)
Adrenergic Agonists EV (dobutamine, dopamine, epinephrine, ...)	26	15.5	3 (11.5%)	23 (88.4%)
Opioid analgesics EV and VO (morphine, fentanyl, methadone ...)	26	15.5	4 (15.3%)	22 (84.7%)
Specific drugs (Electrolytes, Nipride, Oxytocin EV ...)	26	15.5	2 (7.7%)	24 (92.3%)
EV sedatives (midazolam, phenobarbital, diazepam, ...)	22	13.1	6 (27.3%)	16 (72.7%)
EV antiarrhythmics (amiodarone, lidocaine)	13	7.7	2 (15.4%)	11 (84.6%)
Inhaled and IV anesthetics (Propofol, lidocaine,	3	1.8	1 (33%)	2 (66%)

bupivacaine ...)				
Chemotherapy	1	0.6	1 (100%)	0 (0%)
Total*	281	100.0	43 (15.3%)	238 (84.7%)

* Total of HAM prescribed. Mean of HAM per prescription = 1.7

Low adherence to the double checking protocol was observed due to the fact that the 168 analyzed prescriptions, 135 (80%) had HAM in prescription and only 43 HAM, 15.3% were double checked.

DISCUSSION

In this research, as well as in another study¹², there was a high frequency of HAM in medical prescriptions and, although errors that occur with these medications are not the most common, they are the most serious consequences and may cause permanent injury or death.

The high frequency of prescription of HAM exposes patients to a high risk due to their underlying characteristics, such as high ability to cause severe damage to patients and different error logs on the banks of notification.¹³ The management adopted, the institutional culture, the health reporting system and the personal and professional aspects are weaknesses that lead to medication errors. Thus, in order to overcome such weaknesses, it is necessary

to improve the prescription and administration system, to adopt a non-punitive model of management, which support the model of educational and qualified attention in management errors.¹⁴

Among the HAM most prescribed this study it is highlighted the antithrombotic, 101 (60.1%) and Insulins 63 (37.5%).

The class of antithrombotic corresponds to anticoagulants, including heparin and warfarin; direct thrombin inhibitors; thrombolytics, among others. These drugs are essential for the treatment of multiple comorbidities, such as cerebrovascular, peripheral arterial acute and chronic diseases. However, its widespread use is limited and careful, especially because of the risk of bleeding.¹⁵

When antithrombotic agents are administered incorrectly severe AE can be caused.¹⁵ The main AE caused by these medications are associated with insufficient or excessive anticoagulation, which can cause thromboembolism or intracranial hemorrhage; in addition, there

are a number of food and drug interactions.¹⁶

Insulins corresponds to the second most common therapeutic class in the prescriptions analyzed in this study. These are medications recommended for glycemic control in hospitalized clients and for the treatment of diabetes mellitus. Errors and damage caused by this HAM occur to the various types of human insulin and its analogues available in Brasil.¹⁷

Insulins can cause hypoglycemia and irreversible encephalopathy, when administered in overdoses, and hyperglycemia and ketoacidosis, when administered in subdoses.¹⁷ These medications are widely prescribed and due to the high potential to cause an AE, implementing actions to prevent errors is relevant.¹⁸

Fractionation of insulin, also called unit dose corresponds to one of the strategies that help reduce the occurrence of errors and contributes substantially to patient safety. This fractionation is made from the dispensing drugs in an individualized package in accordance with the amount set by the prescription. Thus, it is possible to meet individual needs rationally, so, aiming at improving the quality of care.¹⁹

The entire double-checking in the HAM chemotherapeutic, observed in the study, may be explained by the high complexity of antineoplastic therapy, where low doses characterize therapeutic failure and overdoses, toxic effects.²⁰

The strategy of double checking was implemented in the hospital, field for this research, in order to ensure the procedures inherent in the administration of medications. However, it was noted low frequency of double checking procedures, which makes servicing error-prone. It is demonstrated in the literature that such security strategy is effective with respect to reducing the incidence of AE involving HAM.¹⁰

Double checking requires more time from professionals, because the need for planning. However, the strategy should be incorporated into nursing care, because it is safe and effective to established treatment. Moreover, this was identified as necessary to improve the safe administration of drugs.⁹

The accomplishment of the double checking can be influenced by various conditions, such as the reduced quantity of nursing staff and/or workload. Such situations undermine the effective implementation of the double-checking

strategy, as the daily activities require nurses polyvalent skills, unable to meet the demand of the whole team. However, the nurse should pay attention to the strict supervision of the preparation and administration of medications in order to act and stop any faults present in these processes.^{10,21}

The implementation of strategies and adherence to measures that aim at the improvement of the nursing staff are needed so that there is effective implementation of a safe care and higher quality. However, the need for improvement is observed in the workplace, in order to review the design of professionals and reduce turnover.⁹

Working conditions in which the professionals are submitted directly influence the efficiency of the nursing staff in daily activities. When this team is subjected to work overload due to reduction of the number of professionals or unfavorable conditions, they become vulnerable to error and may cause improper actions and AE, thus impairing the customer cared.²¹

Given the diversity of factors involving medication errors, it is observed that only the implementation of good health practices by the team is not enough

to prevent AE. Nurses have an important role in the face of such occurrences, as these are involved from the guidance of the professional to the account of the case to the Security Commission.

It is necessary to design and implement care protocols, as well as emphasize the educational actions for a change in professional behavior regarding the administration of HAM.²² It is also worth noting the importance of monitoring for adherence and implementation of the actions proposed by institutional protocols with a view to safer care and free of damages.¹⁰

It also surpasses the improvement of strategies adhered by management in order to remedy the difficulties encountered daily by nursing staff, which directly affect the safety and quality of care. Thus, overcoming such barriers will promote institutional improvements and a safe care with higher quality.²²

The implementation of the unit dose is one of the strategies to avoid the mistakes in the application of drugs¹⁹, however, it highlights the need for structures and appropriate conditions for the hospital pharmacy, as well as adequate human resources for the implementation of such strategy.⁵

Fractionation of insulin, also called unit dose, corresponds to one of the strategies that help reduce the occurrence of errors and contributes substantially to patient safety. This fractionation is made from the individualized medication dispensing package in accordance with the amount set by the prescription. Thus, it is possible to meet individual needs rationally in order to improve the quality of life.¹⁹

HAM are frequent, so the implementation of barriers, such as double checking strategy, is needed. In addition, there are measures that help reduce the occurrence of errors, such as verification of the drug, dose, concentration, infusion rate, right patient and standardization of prescription.¹⁰ Double checking can be implemented by: protocols; continuing education; organization of work processes by management; and supervision/monitoring, which will help the whole team in the adaptation process, assisting in the face of daily difficulties.

CONCLUSION

The high frequency of HAM was identified in prescriptions, highlighting the

antithrombotic 101 (60.1%), followed by insulin, 63 (37.5%). It is noteworthy that from the 168 analyzed prescriptions, 135 (80%) had HAM prescribed. It was observed that 45 HAM, 16%, were prepared, administered and double checked, while 238 HAM, 84.6%, passed through the whole process, but did not pass through the double checking safety barrier.

The highest adherence to double checking registration was observed in the following units: Surgical Clinic, 16 (5.3%) and orthopedics 15 (11.9%). Furthermore, the drug classes most double checked were: Antithrombotic 22 (21.7%) and intravenous sedatives, 6 (27.3%).

As a study limitation, cross-sectional design is considered. From the data obtained it was concluded that it is necessary to pay attention to the HAM management process, as they are constantly present in daily practice. For this it is necessary to adhere to strategies aimed at reducing errors. Moreover, the low adherence to double checking, as evidenced in this study, alerts health professionals about the importance of paying attention to the care necessary for increased patient security. Besides, it is necessary to implement and monitor adherence to institutional protocols on the

subject, as well as the management, providing conditions for the double checking to be performed.

It is expected that this research contribute to the effective implementation of the double-checking procedure in order to strengthen the conducts performed by health professionals and generate awareness of the relevance of such a procedure, for the professionals involved in the care.

Besides that, it highlights the indispensability of studies exploring this fact, because from that it will be possible

to provide greater perception to the dispensers and care managers, resulting in safe and positive changes.

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