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## INTEGRATIVE REVIEW OF THE LITERATURE

Ações de enfermagem para administração segura de medicamentos: uma revisão integrativa

Nursing actions for a safe medications administration: an integrative review

Las acciones de enfermería para la administración segura de medicamentos: una revisión integradora

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### ABSTRACT

**Objective:** To present the nursing actions published on the errors prevention during the medications administration in the ICU. **Method:** This is a survey of integrative review, by including papers on nursing actions to reduce errors during the medications administration, published in the period from 2005 to 2011 and indexed in the following databases: LILACS, BDNF and SciELO. **Results:** we have selected and analyzed 13 papers that met the selection criteria. The discussion was designed from the types of errors. It became clear that the most cited actions to prevent errors during the medications administration were: to adopt protocols and guidelines for the medications administration; to identify the drug to be administered in the patient through barcodes; and to use incompatible connectors in different routes. **Conclusion:** the nursing should know the types of errors and adopt actions aimed at reducing errors the medications administration. **Descriptors:** Drug therapy administration, Medication errors, Nursing.

### RESUMO

**Objetivo:** Apresentar as ações de enfermagem publicadas sobre a prevenção de erros na administração de medicamentos na UTI. **Método:** Trata-se de uma pesquisa de revisão integrativa, incluindo artigos sobre ações de enfermagem para reduzir erros na administração de medicamentos, publicados no período de 2005 a 2011 e indexados nas seguintes bases de dados: LILACS, BDNF e SciELO. **Resultados:** foram selecionados e analisados 13 artigos que atendiam aos critérios de seleção. A discussão foi elaborada a partir dos tipos de erros. Evidenciou-se que as ações para a prevenção de erros na administração de medicamentos mais citadas foram: adotar protocolos para a administração dos medicamentos; identificar o medicamento a ser administrado por código de barras; e usar conectores incompatíveis em vias diferentes. **Conclusão:** a enfermagem deve conhecer os tipos de erros e adotar ações para reduzir erros na administração de medicamentos. **Descritores:** Administração de terapia medicamentosa, Erros de medicação, Enfermagem.

### RESUMEN

**Objetivo:** Proporcionar cuidados de enfermería publicados en la prevención de errores en la administración de medicamentos en la UCI. **Método:** Se trata de un estudio de revisión integradora que incluye artículos sobre las acciones de enfermería para reducir los errores en la administración de medicamentos, publicados entre 2005 a 2011 indexados en bases de datos: LILACS, SciELO y BDNF. **Resultados:** Se seleccionaron y analizaron 13 artículos que cumplieron con los criterios de selección. La discusión se ha elaborado a partir de los tipos de errores. Quedó claro que las acciones para prevenir errores en la administración de medicamentos fueron más citados adoptar protocolos y directrices para la administración de medicamentos, identificar el fármaco a ser administrado por código de barras, y utilizar conectores incompatibles de diferentes maneras. **Conclusión:** La enfermería debe conocer los tipos de errores y tomar medidas para reducir los errores en la administración de medicamentos. **Descritores:** Administración de medicación, Errores de medicación, Enfermería.

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## INTRODUCTION

**T**he medication administration is considered one of the activities of greatest responsibility performed by the nursing staff.<sup>1</sup> The nurse has specific knowledge that enables it and imposes responsibilities in conducting medication administration to patients. But, even with all the preparation and professional knowledge, medication administration errors have caused serious consequences to patients.<sup>2</sup>

According to the American Society of Healthy-System Pharmacists, medication error is defined as: any preventable event that, actually or potentially, can lead to the inappropriate use of medication. This concept implies that the improper use might or might not harm the patient, and it does not matter if the medication is under the control of healthcare professionals, patient or consumer. The error might be related with the professional practice, products used in the healthcare field, procedures and, even, communication problems, including prescription, labels, packaging, names, preparation, dispensation, distribution, administration, education, monitoring and use of medications.<sup>3</sup>

Among the consequences of these errors, we can highlight the increased morbidity and mortality, prolonged admission time and significant increase in the healthcare costs. Among other factors that increase the likelihood of medication errors, it should be added the lack of healthcare professionals; overwork, excessive working days and higher number of patients (which requires high complexity actions). In these working conditions, it is asserted that healthcare professionals, even highly skilled and experienced, when exposed to work environments with these characteristics, might make mistakes due to latent failures within the medication system.<sup>2</sup>

The “National Coordinating Council for Medication Error Reporting and Prevention” (NCCMERP) defines Medication error (ME) as “any preventable event that might cause or lead to the inappropriate use of medication or cause harms to the patient while the medication is under control of a healthcare professional, patient or consumer. These events might be related with professional practices, with the products, procedures or systems, including prescriptions orally transmitted, labels, packaging, nomenclature, preparation, dispensation, distribution, administration, education, monitoring/tracking and use of medications”.<sup>4</sup>

In this context, it becomes essential to address what measures might be conducted by the nursing professional, with a view to preventing and reducing the number of described errors, which generate increased medical costs and harms to patients admitted to the intensive care unit (ICU), who almost always are in a serious condition and often require a greater number of medications.

Thus, the **research question** that has guided the study was: What are the nursing actions published for minimizing the occurrence of errors during the medication administration in the ICU?

This study aims at presenting the nursing actions to minimize errors during the medication administration in the Intensive Care Unit (ICU).

Thus, by highlighting the relevance in question, a study found that from a total of 132 medication errors, 36% occurred in the prescription phase, 32% in administration, 28% in dispensation and 4% in the prescribed drugs transcription.<sup>5</sup>

Another study that addresses rates of errors during the medication administration reveals alarming rates related with medication errors, by evidencing rates above 70% in all the studied sectors.<sup>6</sup>

Therefore, by glimpsing one nursing care, without charge, safe and fruitful with regard to the pharmaceutical administration, one should act to prevent the occurrence of errors, by identifying them to assist in the development of barriers that minimize their occurrence during the medication administration process, thus enhancing the patient safety.

## METHOD

To meet the proposed objective of this study, we have performed a national integrative review, by adopting the following steps: definition of the research question, descriptors choosing, definition of selection and exclusion criteria; survey of bibliographic material and analysis of the obtained data.

From the objective, we have included all papers about the nursing actions to minimize the occurrence of errors during the medication administration, published between 2005 and 2011 and indexed in the LILACS, BDEF and SciELO databases, by aiming at obeying the literature recommendation to seek different sources before holding publications surveys. The selection criteria were: papers in Portuguese, with texts freely available and in their full version, being that they should have been published within the specified period; indexed by the terms of the MeSH/DeCS “pharmaceutical therapy management” and “medication errors”, besides to referring to measures for reducing the occurrence of errors during the medication administration. We have excluded all papers that did not meet the selection criteria and not addressed actions to minimize the occurrence of errors during the medication administration.

For data collection, we have developed a tool based on literature review protocols, given that the items from original language - English - “citation” and “intervention” were replaced by the Portuguese entries “*título*” and “*procedimentos metodológicos*”.

The results were described followed by interpretation and classification of the evidence level. The analysis was designed from the described errors during the medication administration, by providing a discussion on the nursing actions for preventing errors during the administration thereof.

## RESULTS E DISCUSSION

We have found 369 papers and selected 13, which were in line with the selection criteria. Next, we will show the approach of the main findings from the selected papers, as shown in Table 1.

**Table 1:** Distribution of the results of the papers related with nursing actions to prevent errors during the medication administration in the ICU, according to works published in the period from 2005 to 2011

BASE/ YEAR/ LEVEL	AUTHOR	TITLE	OBJECTIVE	METHOD	RESULTS
LILACS 2011 Level 5	Corbelli ni VL, Schilling MCL, Frantz SF, Godinho TG, Urbanet to JS.	Adverse events related with medications: perception of nursing technicians and assistants. <sup>(7)</sup>	To know the perception of nursing technicians and assistants on adverse events related with medications.	Study with qualitative nature.	The most commonly involved factors in medication errors are overwork and patient misidentification, besides other associated factors. There is the need to develop actions for promoting a change in culture that assures the patient safety in the hospital institutions.
LILACS 2010 Level 4	Franco JN, Ribeiro G, D'Inno nzo M.	Perception of the nursing staff on causal factors of errors during the medication administration. <sup>(8)</sup>	To identify the types of errors and the risk factors that might occur during the medication administration process.	Descriptive, exploratory and quantitative research.	The pharmaceutical administration is one of the most important nursing activities; therefore, the awareness of the whole nursing staff that there will not be punishment in the occurrence of the error should be made.
SciELO 2010 Level 3	Teixeira TCA, Cassiani SHB.	Root cause analysis: assessment of medication errors in a college hospital. <sup>(9)</sup>	To identify and analyze the types of medication errors observed in doses of medications that were prepared and administered differently from those prescribed.	Descriptive study, by using the method of root cause analysis.	74 medication errors were identified during the medication preparation and administration by the nursing staff. Dosage and schedule errors, as well as unapproved medications. To reduce errors, it is necessary having a constant, careful and detailed analysis, by healthcare institutions, of errors that effectively occur.
SciELO 2009 Level 4	Rosa MB, Perini E, Anacleto TA, Neiva HM, Bogutchi	Errors in hospital prescription of potentially dangerous medications. <sup>(10)</sup>	To analyze the practice of prescribing high-risk medications and its relationship to the prevalence of medication errors in the	Retrospective and cross-sectional study.	75% of the errors found in prescriptions might be classified as writing errors, being that problems with the pharmaceutical form, dosage omission and administration route were the most prevalent.

	T.		hospital environment.		
SciELO 2009 Level 3	Hinrichsen SL, Vilella TAS, Lira MCC, Moura LCRV.	Prescribed medications monitoring in the ICU. <sup>(11)</sup>	To analyze the use of prescribed medications to patients admitted to the ICU of a college hospital in the city of Recife/PE/Brazil.	Prospective and observational study.	Careful monitoring of patients by using several medications is needed to reduce the incidence of adverse events and medication errors, especially in relation to antibiotics prescriptions in ICUs.
SciELO 2007 Level 4	Silva BK, Silva JS, Gobbo AFF, Miasso AI.	Medication errors: prevention behaviors and proposals from the perspective of the nursing staff. <sup>(12)</sup>	To identify, through reports of the nursing staff, the types of behaviors of the nursing professional before the errors during the medication administration and the proposals to minimize such errors.	Cross-sectional, descriptive and exploratory study.	Humans are fallible and, hence, errors are often found in the healthcare assistance. One cannot eliminate them, but one can minimize or prevent them through strategies directed to the medication system.
SciELO 2007 Level 5	Silvia AEBC, Cassiani SHB, Miasso AI, Opitz SP.	Communication problems: a possible cause of medication errors. <sup>(13)</sup>	To identify and analyze the existing weaknesses of communication in the medication system processes.	Descriptive study, data collection, semi-structured interview with structured script.	The used media should be reviewed in order to create a safe medication system for the patient.
SciELO 2006 Level 5	Kawano DF, Pereira LRL, Ueta JM, Freitas O.	Accidents with medications: how to minimize them? <sup>(14)</sup>	To present and discuss on the problems related with accidents involving medications and strategies to minimize them.	Literature review.	Healthcare services should prioritize the user's safety, with a view to reducing avoidable accidents involving medications, by adopting electronic prescription systems of medications.
SciELO 2006 Level 5	Coimbra JAH.	Prevention and detection of medication errors. <sup>(15)</sup>	To identify the methods of detection and prevention of medication errors.	Literature review.	For reducing the medication errors, it is necessary that professionals, trainer academy of human resources in health, researchers, healthcare institutions and the State itself, become aware and adopt a systemic approach with preventive strategies towards the medication errors.
SciELO 2006 Level 4	Teixeira TCA, Silva AEBC, Cassiani	The medications preparation and administration process: identification of	To analyze the medications preparation and administration process in four	Multicentric, descriptive/exploratory study	The building of a multidisciplinary committee to assess the system, discussion groups among the nursing staff members, environmental improvements, courses and

	SHB, Grou CR, Oliveira RC, Fakh FT.	problems with sights to propose improvements to prevent medication errors. <sup>(16)</sup>	Brazilian hospitals, by identifying existing problems and proposing improvement measures.		continuous training and effective presence of the nurse in the process are some suggestions for reaching a better quality and safety in the patient care during the medications preparation and administration process.
SciELO 2006 Level 4	Miasso AI, Grou CR, Cassiani SHDB, Silva AEBC, Fakh FT.	Medication errors: types, causal factors and steps undertaken in four Brazilian hospitals. <sup>(17)</sup>	To identify and analyze in four hospitals from the different Brazilian regions, types, causes, administrative measures and suggestions regarding the medication errors, from the perspective of professionals involved in the medication system.	Multicentric study classified as exploratory survey type, which makes use of the qualitative approach.	The lack of attention, individual mistakes and problems in services management were the major causes of the errors. Reports were the main steps undertaken in the face of the errors, and changes in individual attitudes were the most frequently mentioned factors as a way to prevent them.
LILACS 2006 Level 5	Lopes CHAF, Chaves EMC, Jorge MSB.	Medication administration: analysis of the nursing scientific production. <sup>(18)</sup>	To analyze the nursing scientific production about the medication administration, in the period from 1999 to 2004.	Literature review.	The papers about medication errors were prevalent. This shows the concern of the authors regarding the knowledge of pharmaceutical therapy, since the errors prevention is the only way to prevent damages to the customer life.
SciELO 2005 Level 5	Miasso AI, Cassiani Silvia HB.	Medication administration: final nursing orientation for the hospital discharge. <sup>(19)</sup>	To assess the final nursing orientation for the hospital discharge with regard to the pharmaceutical therapy in an admission clinic of a college hospital in the city of the São Paulo State's hinterland.	It is a descriptive, cross-sectional and ethnological study.	The nursing professional, by directly acting during the medication administration to the patient, plays a major role in the orientation thereof, with regard to the pharmaceutical therapy.

The majority of the selected papers were comprised of original researches (6), by reaching a rate of 46%, whose interventions have indicated evidence strength in level 5. Another 4 papers (37%) focused on the interventions presented in descriptive and qualitative studies, characterized with evidence strength in level 4, and only 3 papers (15%) showed evidence strength in level 3, obtained from well-designed clinical essays, but with no randomization.

By analyzing the selected papers, it should be realized that the medication errors are identified and their frequencies vary from one study to another, due to the medication

process is different in each institution and possesses unique characteristics that need to be identified.

Accordingly, in order to meet the proposed goal of presenting the actions to reduce the occurrence of errors during the medication administration in the ICU, according to the selected papers, we chose to mention the most common types of errors in medication administration and related them with the main actions to prevent thereof.

The medication administration after the expiration date is one of the types of errors described in the medication administration stage. To avoid this type of error, the professional who will administer the medication should check the expiration date, reading carefully the labels, observing the medication aspect and following the instructions for preparation before its administration.<sup>7</sup>

Schedule errors/adjournment are very common, it is estimated that up to 30% of administration errors are related with the schedule or to an inappropriate adjournment. One of the main barriers to prevent this type of error is scheduling the medications in an electronic manner. The electronic scheduling of medications by nurses is considered a barrier to errors prevention, by avoiding standardized schedules and some systems to identify probable drug interactions favored by the scheduling. Therefore, one should avoid that the standardized adjournments are marked for a same time period, which overburdens the medications preparation and administration.<sup>8,9</sup>

Electronic prescriptions, which aim at facilitating the understanding of the prescription, besides the pharmacist's role in the medication dispensation and the production of an errors report, not with a punitive nature, but educator and forming a service of continuing education to qualify the nursing professionals who are at the end of the medication administration process.<sup>10</sup>

Some studies cite - as an action to prevent errors - the importance to closely follow the time intervals among the administered dosages, due to pharmacokinetic and pharmacodynamic events, which provoke significant changes in the plasma concentrations, by altering the medication effect on its action site, which justifies the need for the dosage follows a sequence in the time, so that the drug concentration is kept.<sup>11,12</sup>

Another described error is the unauthorized medication administration, in which, it is always recommended the updating by the barcode, a barrier that hinders the medication errors, by being a strategy to intercept such errors, both in the dispensation stage and in the medication administration process.<sup>9</sup>

The technical error is described as an unusual error. To prevent this type of error, it is recommended to regularly have training and guidance from the professionals concerning the medications preparation and administration techniques, besides the presence of protocols and guidelines for the medications administration as strategies to avoid such errors, standardizing the procedure and preventing the errors.<sup>9</sup>

To avoid the occurrence of further or reduced dosages, it is recommended that the medical prescription is analyzed at the time before the medications administration, so that the changes performed in the prescription period are verified. Another action to minimize the occurrence of this type of error is the administration by barcode, as a strategy, both in the dispensation stage and in the medication administration process by the nursing staff.<sup>9</sup>



Administration route-related errors are also frequently reported, both in the academic scope and in the media, due to disastrous damages that this type of error can trigger to the user. To avoid route-related errors, it is recommended to identify the routes of the catheters for each medication and highlight each route with distinct colors, besides making use of incompatible connectors when the routes are different (example: a syringe for administering enteral medication should not be fitted to the venous route).<sup>7,9</sup>

To apply the medication in the wrong patient is also considered an error with potential for provoking serious harms. Accordingly, it should be prioritized the correct identification of the patient at the medication administration time, by confirming the identity through at least two manners (example: by the patient's name and the medical chart number), identification wristband and barcodes usages during the medication administration.<sup>9</sup>

Another preventive action concerning the patient identification refers to the perception of medications allergies. In such cases, one should include the use of colored wristbands as a way to communicate about already known medications allergies, since it is also an effective measure for preventing errors.<sup>13</sup>

Still in the same approach, more than just identifying the patient, one should include it in the safety issues, by assuring an effective and active participation during the administration stage, whenever it is possible.<sup>13</sup>

The infusion errors/wrong speed should be avoided, by prioritizing the venous medications administration by infusion pumps. The prescribed guidelines for the medications administration should be followed by the nursing staff, since this can interfere with the infusion dosage and interval. Whenever there is a need of calculation, this should be conducted by, at least, two professionals. Furthermore, it is remembered that the nursing staff needs to be trained, whenever there is a new infusion device in hospital.<sup>14</sup>

The occurrence of infusion errors might lead to the phlebitis. Accordingly, when administering a venous medication through the peripheral route, one should assess the permeability of the access and inflammatory signs that might indicate a possible phlebitis. In these situations, it should be provided a new intravenous site, observing the expiration date of the solution and the exchange frequency of the IV lines and venous accesses, according to the institution's policy.<sup>7</sup>

Concerning the dosage errors, they might be avoided through the dispensation by unit dosage, which is described as a strategy capable to prevent errors during the medications administration, which might be adopted in healthcare institutions. It also assists in reducing the medications costs and providing an increased control and medication usage by the pharmacy.<sup>9,12</sup>

It is noteworthy that, for achieving a safe administration, all medication should be kept in its container and with its own label, one should protect it from the exposure to heat and light, as the particularity of each one, besides chilling it, adequately, when it requires.<sup>7</sup>

The absence of medication conference and record is a practice that can lead to the occurrence of other errors of greater harm to the patient, such as for example, double administration of a same drug. Accordingly, one should, immediately after the drug administration, check, record or write the action that has just been held.<sup>15,16</sup>

The lack of patient monitoring after the drug administration is also considered an error, since the monitoring after the medications administration minimizes the clinically manifested consequences by the patient, such as the presence of adverse reactions or symptoms after a certain time in which the medication was administered.<sup>17,18</sup>

The medications administration is a responsibility of the nursing professional who, through its training, was qualified to perform the task of administering medications and, therefore, it is the responsible for holding this activity within the hospital environment. It is recommended that professionals value the medications administration and recognize that a safe drugs administration goes beyond the five hits identification.<sup>9</sup>

Accordingly, there are numerous nursing actions to minimize the occurrence of errors during the medication administration in the ICU. These actions go beyond the individual measures and cover the verification of causes, rates and consequences of errors, in order to make this procedure safer.<sup>19</sup>

## CONCLUSION

Upon proposed objective, we have emphasized as main nursing actions to minimize the occurrence of administration errors: to avoid standardized scheduling and implementation of the electronic scheduling; to adopt protocols and guidelines for the medications administration; to identify the drug to be administered in the patient through barcodes; to identify the lumens of catheters regarding each medication; to highlight each administration route with distinct colors; to use incompatible connectors in different routes; to identify the patient through two ways.

From the presented results and discussion, we can conclude that the aim was achieved, since we have described the nursing actions to reduce the occurrence of errors during the medication administration in the ICU from the viewpoint thereof.

It is recommended to think about further studies on the influence of the technology in preventing errors in the medication administration stage. Technology can make some things better and some not so, but it is essential to study its impact, mainly when it is linked to the nursing work.

It is necessary to conduct an analyze on the complexity of the issue at stake in the healthcare institutions and, based on these actions, strengthening the nursing's role in providing safety throughout the pharmaceutical administration process to the patient, by including continuing education and retraining directed to the staffs.

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