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REVIEW ARTICLE

MEDICATION ERRORS AND INCIDENTS IN PRIMARY CARE: INTEGRATIVE REVIEW

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ABSTRACT

Objective: To identify, in the scientific literature, publications on medication errors and related incidents in primary health care. **Method:** An integrative literature review was conducted in the databases Medical Literature Analysis and Retrieval System Online, Cumulative Index to Nursing and Allied Health Literature, Scientific Electronic Library Online and Web of Science. Seventeen articles that met the inclusion criteria were analyzed. For data extraction, the selected articles were read in full. **Results:**Of the 17 studies analyzed, seven (41.17%) were indexed in both PubMed and Medline, nine (52.94%) in Web of Science, one (5.9%) in Scielo and none in Cinahl. The studies point to strong evidence in clinical application, most of these show that prescriptions with incorrect drugs, incorrect doses, drug interactions and drug allergies were the main causes of errors with potential for serious harms. **Conclusion:**The development of research aimed to identify strategies and interventions for medication errors is still growing. It is known that these studies provide subsidies for the improvement of practices, in addition to providing greater safety in the medication process, in order to reduce preventable adverse events.

Keywords: Patient safety. Primary health care. Medication errors.

INTRODUCTION

Improving the safety of medication use has become an important issue, not only in the hospital, but also in primary health care (PHC). but it is known that studies are still scarce in this level of care, making it important to implement knowledge about the rational use of medicines, in order to meet the individual's need without causing damage[1]. However, research on patient safety in PHC is rare, especially in developing countries, evidencing gaps in knowledge at this level of care, where the largest number of care services is provided, causing adverse events to also occur in this environment[2,3].

Medication errors (MS) are among the most frequent adverse events that can affect patient safety.In addition, it is known that these errors can occur at any stage of the system, being classified into: prescription errors, dispensing errors and administration errors[3,4].

A recent study conducted in PHC points out the risks related to adverse events and their potential to cause harm to patients, especially when related to polymedication[5]. The World Health Organization (WHO), in 2017, pointed out that unsafe medication administration and medication errors are one of the main causes that result in a high rate of occurrence of preventable injuries and damage in health systems, errors that can cause high costs annually worldwide, situations that can result in very serious injuries and even deaths[6].

In Brazil, a study conducted in the Federal District (DF, as per its Portuguese acronym) with the objective of analyzing drug prescriptions identified that the highest incidence of prescription errors was related to the absence of the pharmaceutical form (57.6%) and abbreviations (97.7%). Moreover, it identified drug interactions present in 56% of prescriptions, representing an average of 2.7

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interactions per prescription[7].

Generally, medication errors are complex events, involving multiple steps, procedures and people. Accordingly, it is important to implement safe strategies in the medication process, that is, in the way that drugs are prescribed, dispensed, administered and monitored in health facilities[4,8].

In this perspective, this study is justified by the need to highlight medication errors and understand related risks, with the aim of publicizing interventions on how to improve safe medication in PHC. Given this context, this article has the objective ofidentifying publications in the scientific literature about medication errors and related incidents in primary health care.

METHOD

It is an integrative review, which is a research method that allows, through its systematic and broad character, the analysis of scientific articles, favoring a thorough understanding of the theme and the dissemination of knowledge produced by other writers9. The process of preparing the integrative review was based on six steps: 1) identification of the theme and elaboration of the guiding question; 2) literature search; 3) collection of data and categorization of studies; 4) critical analysis of the studies; 5) discussion of results; and 6) presentation of the integrative review.

In order to elaborate the research guiding question, the recommendations of the PICo strategy - Population Interest Context were followed: (P) primary health care users; (I) medication errors and related incidents; (Co) Primary Health Care[9]. Thus, the following guiding question was elaborated: what is the scientific evidence identified in the literature about medication errors and related incidents that occurred in Primary Health Care?

Articles were considered eligible within the following inclusion criteria: published between 2013 and 2020, justifying that in 2013, the Brazilian Ministry of Health (MS, as per its Portuguese acronym) instituted the National Patient Safety Program (PNSP, as per its Portuguese acronym)[10] and the Safety Protocol in the prescription, use and administration of drugs8, available in full online and free of charge, written in Portuguese and English and addressing medication errors related to patient safety in primary health care and full articles published and indexed in databases: Medical Literature Analysis and Retrieval System Online (Medline) accessed on the PubMed portal, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scientific Electronic Library Online (SCIELO) and Web of Science.

Articles that had errors other than medication were excluded; as well as patient safety in other health care services, such as hospitals, emergencies, hospitals or psychiatric clinics; editorials; reviews; theoretical reflections; dissertations; theses; abstracts published in annals of events and repeated articles.

The survey of the articles was performed in August 2020. To that end, the followingDescritores em Ciências da Saúde(DeCS) or Medical Subject Headings (MeSH) were used: “patient safety”; “primary health care”; “medication errors”, crossing the descriptors among themselves, through the Boolean operator “AND”.

In order to extract and synthesize the information from the studies included in the review, a Microsoft Excel spreadsheet was prepared with the main information: subjects, study design, sample size, measurement of variables, analysis method, concepts employed and main results.

From the descriptors, 204 articles were found, which were evaluated by analyzing the titles and abstracts. Nevertheless, 168 were excluded because they did not meet the inclusion criteria. In cases where the titles and abstracts were not sufficient to define the initial selection, the full publication was read, where 19 articles were excluded, as they also did not meet the inclusion criteria defined for this study.After this stage, 17 articles were selected that met the inclusion criteria. The steps were carried out through independent reading and by peers to maintain methodological strictness. The analysis and interpretation of the data started with an exploratory reading of the studies, carrying out the construction of a synthesis on the bibliometric data of the selected studies and a table with the research data: title, year, country, level of evidence, type and objective of the study.

Figure 1 describes the flowchart for the selection of articles for the integrative review, based on the PRISMA model[11].

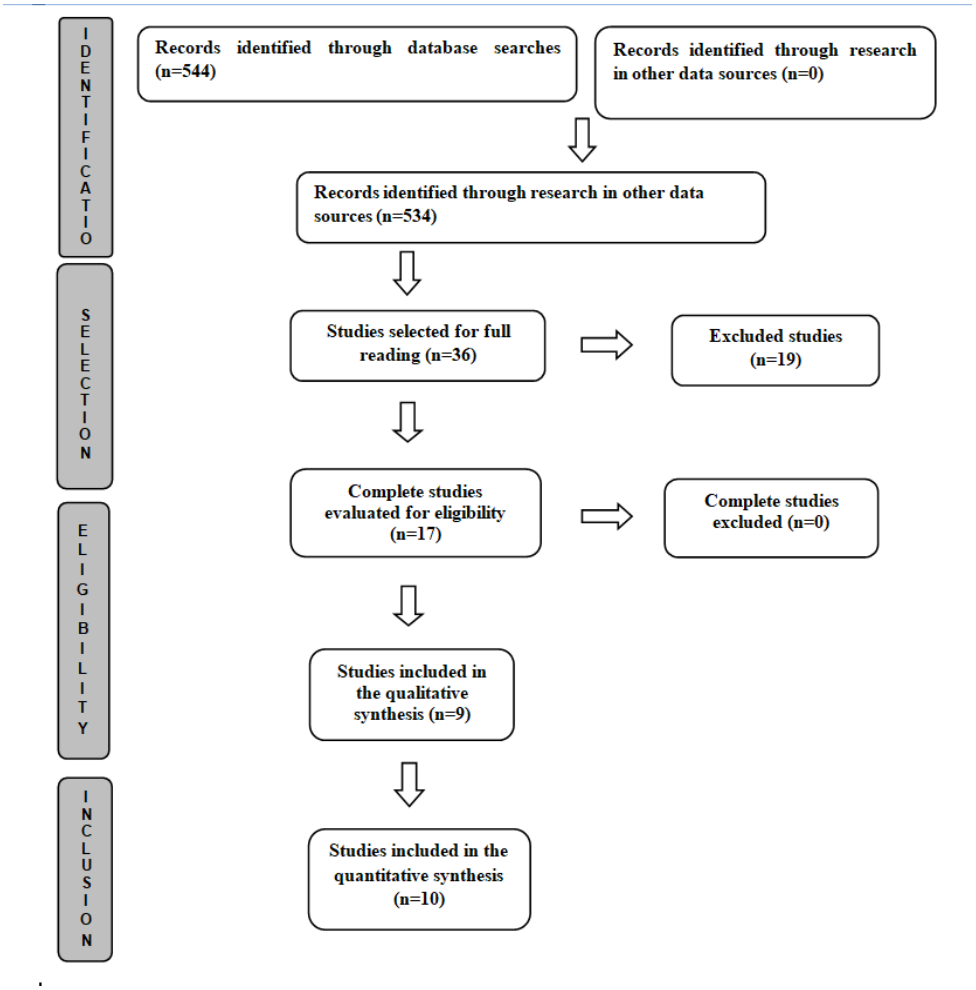

Figure 1. Flowchart of the selection of articles. Brasilia - DF, 2020.

For the level of evidence, the following classification was considered: level 1 evidence from systematic reviews or meta-analysis of Randomized Controlled Clinical Trials (RCCC); level 2 evidence obtained from at least one well-designed RCCC; level 3 originating from clinical trials well-designed without randomization; level 4 from a well-designed case-control and cohort studies; level 5 from systematic reviews of descriptive or qualitative studies; level 6 from a single descriptive or qualitative studies; and level 7 from evidence originating from opinion of authorities and/or committee of experts[12].

The data obtained were interpreted and presented in tables and in two categories.

RESULTS

Of the 17 analyzed studies, seven (41.17%) articles were identified in Medline via Pubmed, nine (52.94%) in Web of Science and only one (5.9%) in the SciELO database. None was found in the Cinahl electronic library.

In relation to the continent, 11 (64.71%) were developed in Europe, five (29.41%) in America and one (5.9%) in Asia (Table 1).

In general, the following was revealed: of the total number of articles selected, eight (47.06%) were studies arising from a single descriptive or qualitative research and with level of evidence 6; it was observed that only two (11.77%) were randomized clinical trials (level of evidence 2). These studies are considered to have strong evidence for clinical application.

It was clarified, in at least 13 studies (76.47%), the importance of strategies and solutions in the prevention of medication errors.

Table 1. Characteristics of the selected studies related to the title, year of publication, country, level of evidence, method and objective of the study. Brasilia - DF, 2020.

TITLE / YEAR / COUNTRY	EVIDENCE LEVEL	TYPE OF STUDY	OBJECTIVE OF THE STUDY
Aligning medication reconciliation and secure messaging: qualitative study of primary care providers' perspectives. 2013, Boston, Massachusetts, USA[13]	4	Observational study	To describe the experiences of primary care providers in reconciling outpatient medication and safe messages (safe email between patients and providers) and to obtain insights into a virtual medication reconciliation system using safe messages (SM).
How do community pharmacies recover from e-prescription errors? 2014, Pittsburgh, Pennsylvania, USA[14]	5	Qualitative study	To describe the process used by the community pharmacy team to detect, explain and correct electronic prescription errors.
Validity of and interrater agreement on the LINNEAUS Euro-PC medication safety incident classification system in primary care in Poland. 2014, Lodz, Poland[15]	6	Descriptive study	To evaluate the validity of a new classification of drug safety incident system in primary care in Poland.
Seguridaddel paciente enatención primaria: proyecto PREFASEG (PREscripciónFArmacológicaSEGura). 2014, Catalonia[16]	4	Cross-sectional observational study	To evaluate the usefulness, design problems or acceptability of the PREFASEG software, which aims to prevent adverse events related to the use of medications in the context of PHC.
A Randomized Controlled Trial of Two Interventions to Improve Medication Reconciliation. 2014, Cleveland, USA[17]	2	Randomized study	To evaluate the impact of two interventions on the agreement between the medication lists in the electronic medical record and what the patients report actually taking.
The Hidden Role of Community Pharmacy Technicians in Ensuring Patient Safety with the Use of E-Prescribing. 2015, USA[18]	4	Observational study	To describe how support staff in community pharmacies, specifically pharmacy technicians, use electronic prescription and the characteristics of technicians who ensure the safety of medicines.
Healthcare system intervention for safer use of medicines in elderly patients in primary care a qualitative study of the participants' perceptions of self-assessment, peer review, feedback and agreement for change. 2015. Malmö, Sweden[19]	6	Qualitative Study	To evaluate the perception of participants in the SÄKLÄK project, which aims to increase the safety of medicines, especially for elderly patients, in primary care.
Design of the POINT study: Pharmacotherapy Optimisation through Integration of a Non-dispensing pharmacist in a primary care Team (POINT). 2015, Utrecht, Holanda[20]	3	Estudo de intervenção controlado não randomizado	Avaliar o efeito da integração de um farmacêutico não dispensador na prática geral sobre a segurança da farmacoterapia na Holanda.
Medication incidents in primary care medicine: protocol of a study by the Swiss Federal Sentinel Reporting System. 2015, Zurique, Suíça[21]	4	Estudo Prospectivo	Descrever o tipo, a frequência, a distribuição sazonal e regional de incidentes com medicamentos na atenção primária na Suíça e elucidar possíveis fatores de risco para os incidentes com medicamentos.

To be continued...

Identification of priorities for improvement of medication safety in primary care: a PRIORITIZE study. 2016, Londres[22]	6	Estudo descritivo	Utilizar uma nova metodologia de *crowdsourcing* e definição de prioridades para reunir e explorar as opiniões dos médicos sobre as causas e soluções para erros de medicação na atenção primária.
Safer drug use in primary care - a pilot intervention study to identify improvement needs and make agreements for change in five Swedish primary care units. 2016, Suécia[23]	2	Estudo randomizado	Explorar quais necessidades e potencialidades de melhoria, relacionadas à segurança de medicamentos, decorrem de uma intervenção multiprofissional na atenção primária.
The utility of the records medical: factors associated with the medication errors in chronic disease. 2017 Minas Gerais[24]	4	Estudo observacional	Descrever o desenvolvimento da história de medicação a partir dos prontuários médicos para medir os fatores associados aos erros de medicamentos em pacientes com doenças crônicas, em Diamantina, Minas Gerais.
Polypharmacy leads to increased prevalence of potentially inappropriate medication in the Indonesian geriatric population visiting primary care facilities. 2018, Karawang, Indonésia[25]	4	Estudo observacional retrospectivo	Avaliar a prevalência e os pacientes da prescrição de medicação potencialmente inadequada entre a população geriátrica da Indonésia que visita unidades básicas de saúde no distrito de Karawang, usando os critérios de *Beers* e *McLeod.*
Mindful organizing in patients' contributions to primary care medication safety. 2018, Manchester, Reino Unido[26]	6	Estudo qualitativo	Examinar as maneiras pelas quais os pacientes podem contribuir para uma organização consciente com relação à segurança de medicamentos de atenção primária.
SMASH! The Salford medication safety dashboard. 2018, Manchester, Reino Unido[27]	6	Estudo descritivo	Desenvolver e implementar um aplicativo de painel online que entrega essa intervenção de auditoria e feedback de maneira contínua
Medication errors in primary health care records; a cross-sectional study in Southern Sweden**.** 2019, Skåne, Suécia[28]	6	Estudo descritivo	Avaliar o quão bem as listas de medicamentos nos registros médicos correspondem aos medicamentos usados pelos pacientes e explorar quais tipos de erros de medicação estão presentes.
Descriptive analysis of medication errors notified by Primary Health Care: Learning from errors. 2020, Madrid[29]	6	Estudo descritivo	Determinar o cenário, as causas e os malefícios dos erros de medicação notificados pela Atenção Primária à Saúde.

DISCUSSION

Medication errors and related incidents

Medication safety is one of the requirements for patient safety and maintenance of the quality of health services as established by PNSP and the respective responsibilities of health teams and managers with a view to preventing harms to patients. A study on ME reported in the PHC in Madrid found that 70.2% had the potential to cause harm and, of these, 27.5% to cause serious harms. In this study, prescription with incorrect medication, incorrect dose, contraindications, interactions and allergies were the main causes of errors with potential for serious harm. Lack of essential information about the medication can

lead to waste of financial resources, besides therapeutic harm to the user, as evidenced by a study conducted in the Federal District, which identified the absence of pharmaceutical form, route of administration, and concentration among the most frequent errors in the analyzed prescriptions.

The occurrence of ME is a common condition among patients in the city of Diamantina. Polypharmacy was recorded in 54% of the sample and the review of the drug lists revealed that 67.0% of the drugs included at least one risk. The most common risks were: interaction between drugs (57.8%), kidney risk (29.8%), risk of falling (12.9%) and duplicate therapies (11.9%).Among the reasons that explain polypharmacy, we highlight the non-evidence-based treatments, the adoption of combinations with potential drug interactions; pharmacological treatment of side effects of other drugs; and the simultaneous prescription, by several physicians, without the necessary therapeutic reconciliation for the patient.

In Southern Sweden, a study (28) of 56 patients, 18 of whom were older than 75 years, found that only nine patients (16%) had a list of medications on the medical chart that was fully consistent with the medications that they were actually using. A total of 212 medication errors were identified, with the incorrect dose being the most common error (40%). Among patients who exclusively visited a family physician, an average number of 2.4 medication errors was identified per list; and, among those who visited a physician additionally outside PHC, the number was significantly higher (5.0), where the medication omission error was the most common among 23 patients (41%) who visited more than one physician.

Most electronic prescription errors in Wisconsin were attributed to the inadequate design of electronic prescription systems used by physicians or the inability on the part of the pharmacy computer to translate electronic prescription information correctly into its own electronic prescription system.

The prevalence of potentially inappropriate medication (PIM) was the objective of a study carried out in the geriatric population of Indonesia. A total of 3,819 medical records were evaluated using the criteria outlined by Beers and McLeod and Cols. The use of PIM was highly prevalent (52.2%) among the study subjects, with an average age of 65.8 years and predominantly females, implying the urgent need for improvement of professionals on the prescription of inappropriate drugs. The criterion outlined by Beers is an important measure of the quality of health care for the elderly person, and should be incorporated into electronic registration systems to support the prescription process and to identify situations in which non-pharmacological alternatives would be more appropriate.The most frequently prescribed PIM were chlorpheniramine, mefenamic acid, ibuprofen and nifedipine. It is recommended that chlorpheniramine is not prescribed due to its high anticholinergic activity and increased risk of toxicity due to decreased clearance (25).

Not all cases of medication incidents are reported, according to a study carried out in Switzerland, pointing out that there may be some selective reporting of cases of greater clinical importance, and some cases may not be reported due to lack of time or due to legal considerations. Incident notification needs to be encouraged so that they are investigated and promote continuous learning, with a view to preventing incidents in the future.In order to be useful, it is desirable that the incident notification system be easy to use, have a voluntary, non-punitive character, with guarantees of professional anonymity and be handled by a qualified person and mainly have a feedback mechanism.

Similarly, a study conducted in Poland pointed to a lack of awareness among professionals and levels of government about incidents.It was noted that there is little or no involvement in formal reporting systems by physicians and other clinicians because of a culture of perceived “guilt”. The error is still very much associated with guilt, a punitive work environment and a culture of thinking that the errors caused by the health care provider are the result of carelessness. Thus, working with teams on error and guilt may be an alternative to modify and transform the error into a learning opportunity to prevent new events related to the same cause.

Interventions and solutions to improve safe medication

Tools based on information technology (IT), such as applications, programs and electronic prescription can be used to support health professionals to improve the quality and safety of prescription. In Spain, it can be evaluated that the utility of the PREFASEG software (*PREscripciónFArmacológicaSEGura*), inserted in the electronic medical record, allows the online detection of certain ME and aims to prevent adverse events to the use of medicines, which consists of five dimensions: drug interactions, redundant treatments, allergies, drug contraindications with diseases, and drugs advised against in patients over 75 years old.

Once the clinician uses the medical record and prescribes a medication, PREFASEG is automatically activated and checks at the same time that the medication is registered, if it is compatible with the age of patient, if it is an active ingredient that the patient already takes with another trade name, if there is a significant interaction with the other drugs that he/she uses or between the drug and the diseases that are coded in the history and if it is a drug that the patient has had allergies against. When the PREFASEG detects any of these conditions, it notifies the physician through safety alerts.

In Salford, an application called SMASH was developed, an electronic dashboard that provides users with updated information whenever they choose to access it, displays the risks of a serious adverse event, and the feedback is provided in several ways (tables and charts), with individual data instead of general data and recommends actions that are under the control of the user. The role of patients in their safe care is important and the ability of patients to find out when they are "signaled" by safety systems like this proposes a change in the interactions between the patient and the professional.

Corroborating, the protocol of the National Health Surveillance Agency (ANVISA, as per its Portuguese acronym) recommends the use of a computerized program for prescription of drugs with clinical support that provides minimal information on: maximum doses for potentially dangerous drugs/high surveillance and/or with narrow therapeutic index; clinically significant drug interactions; allergies; standardized presentations and concentrations available at the institution.

Patient-aware empowerment and education strategies are also seen as aiding elements in the collective understanding of patient safety risk, potentially contributing to medication management. This potential is realized through four interactive processes: assimilating and applying knowledge about medication risks; communicating with health care professionals; using artifacts; and recognizing the level of trust that can be placed in each of the parties involved. Importantly, patient engagement should not be treated simply as a stand-alone safety intervention, nor should it be assumed or expected to occur on its own; rather, it should be treated as a deliberate strategy to be integrated with other safety-related activities within the medication management system.

Double-checking the electronic prescription, communicating with the patient about the medications before dispensing them, highlighting relevant drug or patient information on the printed electronic prescription, using colored pens when processing electronic prescriptions, and staff approach to handling electronic prescriptions were among the solutions that helped the staff working at a community pharmacy in the United States detect electronicprescription errors before they reached the patient.

Solutions such as developing a standardized discharge summary model, reducing unnecessary prescriptions and minimizing polypharmacy were listed by physicians as priorities. In general, communication between physicians and patients and patient education were seen as key areas for improving drug safety.

Committed leadership, open climate for discussion with the team, through regular meetings, regular evaluation of the cognitive and physical function of patients, in order to ensure their ability to manage their drug treatment, regular checks that drug changes have been documented satisfactorily in medical records and feedback on prescription trends, a common drug list, used by both specialized care and primary care, and consensus among professionals on the prescriptions of inappropriate medications and medications for the elderly persons were identified as strengths in improving patient safety.

The integration of the pharmacist as a team member aims to improve pharmaceutical care, both at the patient level, such as individual

consultations for specific drug therapy problems or questions and medication reconciliation in patients discharged from the hospital, and at the organizational level by optimizing processes within the practice around repeated prescribing, clinical care pathways, administrative efficiencies, and identification of common medication errors.

It is noteworthy, in another study, that the help of pharmacy technicians within the process of evaluating electronic prescriptions ensures patient safety, identifying that technicians were proactive in using a variety of strategies, such as colored boxes or flags to distinguish if there were a suspected error, in order to ensure that the pharmacist double-checked an electronic prescription that he/she suspected had an error, examined the medication profile of the patient prior to the review of the electronic prescription on the part of the pharmacist and examined the electronic prescriptions that were previously reviewed by a pharmacist looking for typos or spelling errors.

Medication reconciliation is seen as an important strategy to achieve safe medication use. It has been observed in scientific evidence that efforts to improve medication list concordance are more likely to succeed when using a multistep approach focused on communication and interaction between professionals and patients. Although an accurate list of drugs is always provided, the prescriber involved should always update the list and be aware that other drugs should be taken into consideration when making new prescriptions, and up-to-date knowledge of safe drug treatment is essential.

In the United States, a study conducted direct reconciliation observations and interviews with practitioners about their perceptions of a virtual medication reconciliation system using safe messaging. The authors report the perception on the part of professionals that medication reconciliation has the potential to improve drug safety.However, they highlighted a series of obstacles at the patient level that prevent the reconciliation of high-quality drugs, highlighting the difficulty in achieving an accurate medication reconciliation, especially among complex or elderly patients or during care transitions.

Professionals were optimistic about the potential use of safe messaging for medication reconciliation, particularly viewing this system as an opportunity to decrease adverse events. They indicated that the care providedby a caregiver (e.g., a family member) for medication reconciliation was helpful for elderly or complex patients, and that social or cognitive factors of patients often made medication reconciliation a challenge.

Drug-related problems can arise at all stages of the medication process. Therefore, medication reconciliation requires the team to: compile a complete list of the previous medications of the patient, make a systematic comparison with active prescriptions, and analyze and resolve any ME. Accordingly, it can be implemented as a regular routine in daily clinical practice, since such an approach can significantly reduce potentially harmful errors.

CONCLUSIONS

The results of this reviewhave allowed us to identify the main medication errors and incidents that occurred in PHC, undermining patient safety. Strategies and interventions focused on medication errors were observed in the studies, providing subsidies for the improvement of practices, in addition to providing greater safety in the medication process, in order to reduce avoidable adverse events. Interventions such as strengthening communication, continuing education, safety culture, teamwork, patient involvement, information technology support, medication reconciliation and Beers' criteria are seen as solutions to provide safe care.

In light of the foregoing, wesuggest that further research be conducted, in search of safer care, in order to contribute to the strengthening and quality of care in primary health care, as well as to promote greater engagement with policies aimed at patient safety in medication. We hope that the results of this study can contribute to the awareness of actions that will provide better quality care and safety in the use of medications, especially at the primary care level.

RESUMO

Objetivo: Identificar, na literatura científica, publicações acerca dos erros de medicação e os incidentes relacionados, na atenção primária à saúde. **Método:** Realizou-se uma revisão integrativa da literatura nas bases de dados *Medical Literature Analysis and Retrieval System on Line*, *Cumulative Index to Nursing and Allied Health Literature*, *Scientific Eletronic Library Online* e *Web of Science.* Analisaram-se 17 artigos que atenderam aos critérios de inclusão. Para extração dos dados, fez-se a leitura, na íntegra, dos artigos selecionados. **Resultados:** dos 17 estudos analisados, sete (41,17%) foram indexados, tanto no PubMed, quanto no Medline; nove (52,94%) na Web of Science; um (5,9%) na base Scielo; e nenhum na Cinahl. Os estudos apontam fortes evidências na aplicação clínica, sendo que a maioria desses mostra que prescrições com medicamento incorreto, dose incorreta, interações medicamentosas e alergias medicamentosas foram as principais causas de erros com potencial para danos graves. **Conclusão:** Ainda é crescente o desenvolvimento de pesquisas que visem identificar estratégias e intervenções voltadas aos erros de medicação. Sabe-se que esses estudos fornecem subsídios para o aprimoramento das práticas, além de propiciar maior segurança no processo de medicação, a fim de reduzir os eventos adversos evitáveis.

Palavras-chave: Segurança do paciente. Atenção primária à saúde. Erros de medicação.

ERRORES E INCIDENTES DE MEDICACIÓN EN LA ATENCIÓN PRIMARIA: REVISIÓN INTEGRADORA

RESUMEN

Objetivo: identificar, en la literatura científica, publicaciones acerca de los errores de medicación y los incidentes relacionados, en la atención primaria a la salud. **Método:** se realizó una revisión integradora de la literatura en las bases de datos *Medical Literature Analysis and Retrieval System on Line*, *Cumulative Index to Nursing and Allied Health Literature*, *Scientific Eletronic Library Online* y *Web of Science.* Se analizaron 17 artículos que atendieron a los criterios de inclusión. Para la recolección de los datos, fue hecha la lectura, en su totalidad, de los artículos seleccionados. **Resultados:** de los 17 estudios analizados, siete (41,17%) fueron indexados, tanto en el *PubMed*, como en el *Medline*; nueve (52,94%) en la *Web of Science*; uno (5,9%) en la base *Scielo*; y ninguno en la *Cinahl*. Los estudios señalan fuertes evidencias en la aplicación clínica, siendo que la mayoría de ellos muestra que prescripciones con medicamento incorrecto, dosis incorrecta, interacciones y alergias a los fármacos fueron las principales causas de errores con potencial para daños graves. **Conclusión:** aún es creciente el desarrollo de investigaciones con el objetivo de identificar estrategias e intervenciones dirigidas a los errores de medicación. Sabemos que estos estudios aportan herramientas para el perfeccionamiento de las prácticas, además de ofrecer mayor seguridad en el proceso de medicación, a fin de reducir los eventos adversos evitables.

Palabras clave: Seguridad del paciente. Atención primaria de salud. Errores de medicación.

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