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Non-conformities in the antimicrobial administration process: integrative review

No conformidades en el proceso de administración antimicrobiano: revisión integrativa

Não conformidades no processo de administração de antimicrobianos: revisão integrativa

ABSTRACT
Objective: to identify the possible non-conformities in the antimicrobial administration process described in the literature. Method: integrative review, with searches carried out in the databases Web of Science, PUBMED, LILACS e BDENF. The guiding question was developed according to the PICo strategy: P (population) - nursing; I (interest) - non-conformities; Co (context) - antimicrobial administration, being: What are the possible non-conformities in the antimicrobial administration process described in the literature? Inclusion criteria: articles with abstracts and full texts in Portuguese, English or Spanish and published between 2014 and 2019. The search was carried out between December 2019 and January 2020. Results: nine articles were selected for the research. The main non-conformities pointed out were dose errors and delay in the administration of antimicrobials. All studies were at evidence level four. Conclusion: It is suggested that nurses expand their actions on this topic.
DESCRIPTORS: Antimicrobial Management; Medication Errors; Nursing; Anti-infectives; Drug Administration Routes.

RESUMEN
Objetivo: identificar las posibles no conformidades en el proceso de administración de antimicrobianos descritos en la literatura. Método: revisión integradora, con búsquedas realizadas en las bases de datos Web of Science, PUBMED, LILACS e BDENF. La pregunta guía se desarrolló de acuerdo con la estrategia PICo: P (población) - enfermería; I (interés) - no conformidades; Co (contexto) - administración de antimicrobianos, siendo: ¿Cuáles son las posibles no conformidades en el proceso de administración de antimicrobianos descritos en la literatura? Los criterios de inclusión: artículos con resúmenes y textos completos en portugués, inglés o español y publicados entre 2014 y 2019. La búsqueda se realizó entre diciembre de 2019 y enero de 2020. Resultados: nueve artículos se seleccionaron para la investigación. Las principales no conformidades señaladas fueron errores de dosis y retraso en la administración de antimicrobianos. Todos los estudios estaban en el nivel de evidencia cuatro. Conclusión: Se sugiere que las enfermeras amplíen sus acciones sobre este tema.
DESCRIPTORES: Manejo de antimicrobianos; Errores de medicación; Enfermería; Antiinfecciosos; Vías de Administración de Medicamentos.

RESUMO
Objetivo: identificar as possíveis não conformidades no processo de administração de antimicrobianos descritas em literatura. Método: revisão integrativa, com busca realizadas nas bases de dados Web of Science, PUBMED, LILACS e BDENF. A pergunta norteadora foi elaborada de acordo com a estratégia PICo: P (população) – enfermagem; I (interesse) – não conformidades; Co (contexto) – administração de antimicrobianos, sendo: Quais são as possíveis não conformidades no processo de administração de antimicrobianos descritas em literatura? Critérios de inclusão: artigos com resumos e textos completos nos idiomas português, inglês ou espanhol e publicados no período de 2014 a 2019. A busca foi realizada entre dezembro de 2019 e janeiro de 2020. Resultados: nove artigos foram selecionados para a pesquisa. As principais não conformidades apontadas foram erros de dose e atraso na administração de antimicrobianos. Todos os estudos foram do nível de evidência quatro. Conclusão: Sugere-se que o enfermeiro amplie suas ações nessa temática.
DESCRITORES: Gestão de Antimicrobianos; Erros de Medicação; Enfermagem; Anti-infecciosos; Vias de Administração de Medicamentos.

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INTRODUCTION

Antimicrobial resistance is the ability of bacteria to survive antimicrobials when these drugs are supposed to inhibit growth or destroy microorganisms. This fact has been intensified due to its indiscriminate use, generating extra expenses for health systems and reducing therapeutic alternatives. [1,2]

To intervene in this global problem, the World Health Organization created the Global Action Plan on Antimicrobial Resistance, presenting as its main strategy the Management Program for the use of Antimicrobials or Antimicrobial Stewardship. [2–4]

Actions aimed at the administration of antimicrobials in a timely manner are directly related to both the reduction of microbial resistance and the prevention of medication errors.

Nursing plays a crucial role in the preparation and administration of medications, always worrying about patient safety through the control of schedules, dilutions and adequate intervals. It is up to these professionals to develop actions aimed at increasing safety, minimizing errors and guaranteeing the effectiveness of the treatment. [5–7]

The Regional Nursing Council of São Paulo guides its professionals to use the right ones for safe medication: correct note, right drug, right way, right time, right dose, right patient, patient orientation, drug compatibility and the right to refuse the medicine. [8]

Nursing plays a crucial role in the preparation and administration of medications, always worrying about patient safety through the control of schedules, dilutions and adequate intervals. It is up to these professionals to develop actions aimed at increasing safety, minimizing errors and guaranteeing the effectiveness of the treatment.

Therefore, it is essential to expand knowledge about the factors that interfere with the process of administering antimicrobials. [7]

This study aimed to identify possible non-conformities in the antimicrobial administration process described in the literature.

METHODS

Based on Evidence-Based Practice, an integrative review was carried out in six stages: elaboration of the guiding question, search or sampling in the literature, data collection, critical analysis of the included studies, discussion of the results and, finally, presentation of the results found. [9,10]

The study was guided by a protocol developed by the researchers. The research question was prepared according to the Population Interest Context (PICo) strategy [11], of which: P (population) - nursing; I (interest) - non-conformities; Co (context) - administration of antimicrobials. Thus, the following guiding question was elaborated: "What are the possible non-conformities in the antimicrobial administration process described in the literature? "That done, the search stage was carried out between December 2019 and January 2020. Inclusion criteria: articles with abstracts and full texts in Portuguese, English or Spanish, published between January 2014 and December 2019, considering that the theme is current and the Global Action Plan on Antimicrobial Resistance

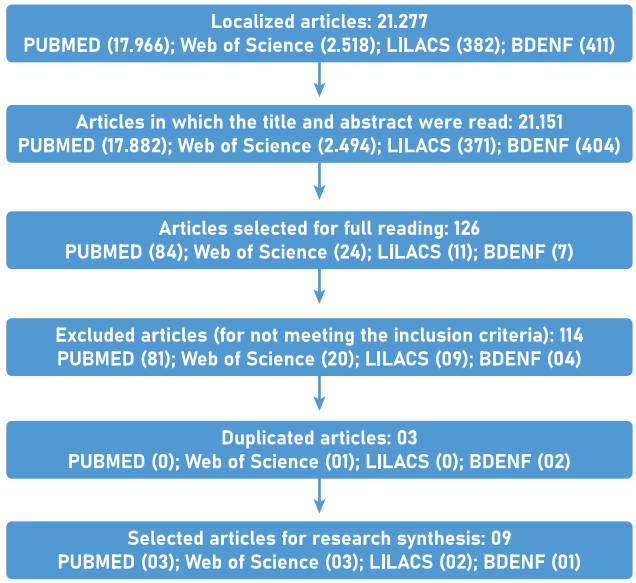
2 was published in 2015. The exclusion criteria: theses, dissertations, pilot study, review articles, letters, editorials and event summaries.

The following databases were used: Web of Science, United States National Library of Medicine (PUBMED), Latin American and Caribbean Health Science Literature Database (LILACS) and Nursing Database (BDENF). We opted to use these bases because they include the main journals in the health and nursing fields, which deal with the topic of interest in the present study.

Descriptors in Health Sciences (DeCS) and Medical Subject Heading (MeSH) were used: Antimicrobial Stewardship (Gestão de Antimicrobianos, Programas de Optimización del Uso de los Antimicrobianos); Medication Errors (Erros de Medicação, Errores de Medicación); Nursing (Enfermagem, Enfermería); Anti-Infective Agents (Anti-Infecciosos, Antiinfecciosos). The Boolean operator and associations between all descriptors in Portuguese, English and Spanish were used, except in the PUBMED and Web of Science databases, which are presented in the English language only.

The classification of the levels of evidence of the articles selected for the research was carried out. [12]: level 1- meta-analysis of randomized controlled clinical studies; level 2- study of experimental design; level 3- quasi-experimental study design; level 4 - non-experimental, descriptive studies or with a qualitative methodological approach or case study; level 5 - case report or data obtained systematically, of verifiable quality or program evaluation data; level 6 - expert opinion, based on clinical experience or expert committee, including interpretations of information not based on research, in regular or legal opinions. Data extraction was based on a validated instrument. [13] The results were presented in a descriptive way.

Figure 1 - Flowchart of the articles found, read title and abstract, selected for full reading, excluded, duplicated and selected for the research. São Carlos, SP, 2020.



RESULTS

Among the 21,277 articles found, nine articles met the inclusion criteria, as shown in Figure 1.

As for the countries where the studies were carried out, four of them were developed in Brazil (44,44%). Malawi published two articles (22,23%). Canada, India and Australia had only one study in each country (11,11% each). In terms of the language in which the subject was most published, English stands out with six surveys (66,67%), followed by Portuguese, with three (33,33%). Although descriptors in Spanish were used, no article was found in that language.

All included studies were classified in level of evidence four (non-experimental, descriptive studies or with qualitative methodological approach or case study). [12]

Chart 1 presents the synthesis of the analysis of the articles selected for the research and its main results.

Chart 1 – Characterization of published articles on non-conformities in the antimicrobial administration process. São Carlos, SP, Brazil, 2020[13]

AUTHOR	OBJECTIVE	TYPE OF STUDY	MAIN RESULTS
Pereira et al., 2018a[14]	Identify drug-induced drug interactions and errors in the preparation of administered antibacterials.	Observational and transversal	In 81 observations (32,5%) there were dose errors. The preparation time was prolonged in some situations.

Santos et al., 2016[15]	Identify risk factors in the administration of antimicrobials by the nursing team.	Retrospective, descriptive, document analysis study	The following were identified: lack of notes on phlogistic signs; inadequacies in the time of administration of antimicrobials; lack of adoption of precautionary and isolation measures and swab collections.
Mula et al., 2019[16]	Examine behaviors that nurses and doctors employ to face the challenges encountered while administering antibiotics.	Qualitative, descriptive case study	The practices were listed in two groups: "Techniques that alter the procedure" (incorrect dilution, preparation of several doses before the time of use and lack of correct administration time, mentioning only morning, afternoon and night) and "Use of non authorized procedures" (change of dose, checking and preparation long before administration, medical prescription to better assist nurses).
Pereira et al., 2016[7]	Evaluate the conformities and non-conformities in the preparation and administration of antibacterials.	Observational and transversal	There was, in all observations, non-compliance with the precepts of the semiotics, evidenced by: absence of disinfection of the medicine ampoules, non-use of gloves during the procedure, antibacterial splashes dispersed in the air, contamination of the syringe plunger, and preparation in advance 30 minutes from the time of administration. The items for checking the administered medication, monitoring and controlling the infusion time were more incidents for non-conformities, with 172 (64,9%), 166 (62,7%) and 159 (60%), respectively.
Mula et al., 2018[17]	Identify factors that influence the timely initiation of antibiotics after prescription at the Adult Emergency and Trauma Center of a hospital.	Case study	Patients did not receive the first dose of antibiotic within one hour after prescription. The possible barriers to the timely start of antibiotics were: long waits, lack of communication/coordinated care and lack of competence.
Pereira et al., 2018b[18]	Identify the relationship between environmental factors and preparation errors and administration of antibacterial drugs	Observational and transversal	The main categories of errors found were: dose error (157), time error (30) and wrong choice of medication (28).
Chambers et al., 2019[19]	Describe the data sources and processes used to develop a program to reduce overuse of antibiotics in long-term care.	Survey	The assessment of barriers/facilitators showed the need for an approach with the inclusion of strategies (1) to establish adherence to changes; (2) align organizational policies and procedures; (3) provide education and ongoing support for employee training; (4) providing information and education to residents and families; (5) establish monitoring of the process with feedback to the team; (6) to send reminders.
James et al., 2015[20]	Gain an understanding of the factors that impact Antimicrobial stewardship in Australia's regional and rural hospitals	Qualitative study	The main perceived barriers were lack of access to education, resources and specialized support. The facilitators were a flatter governance structure, a greater sense of pride, a desire for success and good access to the Internet and telehealth.
Baubie et al., 2019[21]	Determine what barriers and facilitators to administering antibiotics exist in a health facility.	Qualitative study	The following barriers were identified: limited access to clinical pharmacists, physician opposition to changes in administration policies, frequent decrease in antibiotics, high physician workload, incomplete electronic medical record, inadequate visibility of the Stewardship and high level of use of antibiotics in the community.

Source: research data, 2020.

DISCUSSION

The main nonconformities identified were erroneous doses and delays in the administration of antimicrobials. [14–18]

Antimicrobial resistance causes practically intractable infections to appear, and this problem is one of the greatest recent threats to public health. This fact is accentuated with the lack of research in the area and even with inadequate practices of the health professionals involved in this process [22,23], among them, the nursing team.

Corroborating the findings of the current research, a study by MANZO et al.[5], which aimed to investigate the practice of nursing professionals on the medication administration process in general and the circumstances that lead to errors, reported that about 61% of administrations were performed with an incorrect dose and 21% at an incorrect time.

Another study, an integrative review [24], which aimed to identify the evidence and implications of errors in medication administration in general for patient safety, found data similar to this review, with a total of 40 articles, 67,5% of which contained the dosage error and 50% time error.

Delay in the administration of medications is always harmful, however, in the case of antimicrobials, this delay can have even more serious and even irreversible consequences, in addition to increased antimicrobial resistance. In cases of septic patients, for example, the accuracy in initiating and maintaining antimicrobial therapy is directly related to the patient's survival rate. [25]

Due to the important role of the nursing team in this process, guaranteeing therapy, promoting patient safety and collaborating to avoid antimicrobial resistance, adequate knowledge for this purpose is essential. [26]

The nurse has an important role in the management of antimicrobials (Antimicrobial Stewardship), both in minimizing the factors that interfere with antimicrobial administration and, consequently, in antimicrobial resistance, as well as in the early detection of signs of infection and guidance for optimizing antimicrobial treatment. [27] However, there is still a need to expand teaching on the topic so that the strategy is effective. [28–30] The lack of permanent education is highlighted [19,20], this being an action that would help in facing the main non-conformities found. [14–18]

The importance of expanding research on this topic can also be seen in the small number of selected studies and in the type of methodological design (level of evidence IV) identified in all studies in this integrative review.

The limitations of this study lie in the difficulty of generalizing the results obtained due to the lack of investigations with greater methodological rigor.

CONCLUSION

It was concluded that the main non-conformities in the antimicrobial administration process pointed out in the literature were dose errors and administration delays.

It is suggested that nurses, key players in the management of antimicrobials, expand their actions on this theme, both in permanent education activities and their engagement in research aimed at incorporating results in clinical practice with a consequent contribution to reducing antimicrobial resistance. ■

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