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MEDICAL PRESCRIPTION ANALYSIS IN A REFERENCE HOSPITAL IN VALE DO JEQUITINHONHA

Lorena Chaves Fernandes
Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina-MG, Brazil.
http://lattes.cnpq.br/6961392196864905

Fátima Soares Ferreira
Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina-MG, Brazil
http://lattes.cnpq.br/8861421958834537

Renata Aline de Andrade
Department of Pharmacy, Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina-MG, Brazil.
http://lattes.cnpq.br/5619150887178334

Abstract: Medicines are one of the main therapeutic forms available for the treatment of pathological disorders. However, the irrational and mistaken use of these drugs can cause the worsening of clinical conditions and lead to ineffective therapies. In the hospital environment, these mistakes become even more serious in view of the extensive daily prescriptions and clinical states of high complexity inmates. The pharmacist, through the hospital clinical performance of analysis of medical prescriptions, must act in a fundamental way in the collaboration of the conscious use of medicines and in the promotion of the patient's health, through the identification and intervention of Drug-Related Problems (DRP). This study evaluated the quality indicators in the pharmaceutical analysis service, coming from the analysis of prescriptions in the surgical clinic of a hospital with emphasis on the identification and intervention of DRPs, in order to categorize and quantify the causes of these problems. In addition, medical adherence to the proposed interventions and the impact promoted by pharmacological analysis on patient safety were measured. This was a cross-sectional, retrospective and observational study, comprising data collected from the hospital pharmacy system obtained between March and August 2021. 1,725 prescriptions were analyzed and there was pharmaceutical intervention in 324 (18.78%) of them. In all, 20,893 medications were reviewed and there were interventions in 485. The most frequent cause of DRP is related to inconsistencies in the dosage schedule or drug dosage regimen n=144 (29.69%) and the most frequently suggested intervention was the inclusion of medication in the therapeutic regimen n=99 (20, 41%). Of the interventions proposed by the pharmacist, there was adherence in n= 292 (60.20%). The clinical pharmaceutical service contributes significantly to the reduction of DRP, in a way that directly helped in patient safety, reduction of hospitalization time, therapeutic success and comprehensive care of patients, especially in the health of the elderly population.
Keywords: Clinical pharmacy, prescription errors, drug-related problems, pharmaceutical interventions.

INTRODUCTION

The Federal Council of Pharmacy (CFF), through resolution No. 585/2013, regulates the clinical duties of the pharmacist and among these services is the analysis of drug prescriptions regarding legal and technical aspects, as well as the carrying out of interventions and pharmacological discussions. The pharmacist is, therefore, the professional responsible for improving the rational use of medicines, reducing pharmacological risks and optimizing therapeutic pharmacotherapy (AGUIAR et al., 2018; BRASIL, 2013).

In a hospital environment, many patients, such as those who remain hospitalized in the surgical sector, present themselves as susceptible to Drug-Related Problems (DRP), in the face of extensive prescriptions, in the face of clinical states of high vulnerability and complexity (DIAS et al., 2019). MRPs can be classified as any problems associated with drugs that may interfere with the desired clinical management (BASILE et al., 2019; SOUZA et al., 2018).

Due to the problems associated with drugs in medical prescriptions being frequent in the hospital environment, these can be characterized as some of the major causes of adverse reactions within the inpatient service, so that it can actively interfere in the process of therapeutic ineffectiveness, increase in comorbidities and prolonging the patient's stay (NUNES et al., 2017; SOUZA et al., 2018). Fortunately, many DRPs can be avoided with

the help of the clinical performance of the hospital pharmacy.

The daily analysis of prescriptions by the pharmacy is able to identify and reduce DRPs by acting in a preventive way to the occurrence of undesirable damages to the therapy (GARIN et al., 2021; HAILU et al., 2020). This way, pharmaceutical care in the face of prescriptions is highly relevant, in order to promote patient safety, by reducing the occurrence of possible adverse reactions and worsening clinical conditions (AGUIAR. et al., 2018; CRUZ et al, 2019; DIAS et al., 2019).

METHODS

Study design: This is a cross-sectional, retrospective and observational study, covering the records of the analysis of prescriptions and Pharmaceutical Interventions (IF) collected from the pharmacy system referring to the surgical clinic sector of the Nossa Senhora da Saúde Hospital, located in the municipality of Diamantina/Minas Gerais, obtained between March and August 2021. The HNSS sectors are organized by specialties and among them is the surgical clinic sector, which has 35 beds and is intended for patients over 14 years of age who need a surgical procedure orthopedic. The project was approved by the Research Ethics Committee of the Universidade Federal dos Vales do Jequitinhonha e Mucuri on September 27, 2021 under CAAE number 48444221.1.0000.5108, with authorization to waive the Informed Consent Term.

Data collection: The analyzes and IF suggested in the medical prescriptions took place on a daily basis by the hospital pharmacy sector as an integral part of the attributions of the clinical service. In this unit, prescriptions were electronic and valid for 24 hours. Dispensing of drugs was performed by pharmacy assistants after analysis by pharmacists. After the analysis, the prescription errors identified, the suggested FIs and the medical adherence were transcribed as indicators for the electronic clinical management system of the sector.

The causes of DRP, the FI and medical acceptability were categorized according to the *Classification for Drug-RelatedProblems* (PCNE) V 9.1 (2020), which defines nine causes distributed in: (1) selection or (2) inappropriate drug form, (3) drug dosage schedule or regimen, (4) treatment duration, (5) logistics or dispensing process, (6) medication use process and (7) patient behavior through its administration, (8) patient transfer between health sectors or hospital units, and (9) any other reasons that are not related to the previous causes. For each of the FIs, the electronic system of the quality of service indicators was checked for medical acceptability. At the end of the study, the impact of prescribing analysis on patient safety was evaluated, based on the Safety Protocol in the Prescription, Use and Administration of Medicines of the National Patient Safety Program (PNSP) provided by the Institute for Safe Practices in the Use of Medicines (ISMP, 2016).

To perform the calculation, the sum of all drugs prescribed with error in the established period was estimated and for those drugs that contained more than one prescription error, it was considered only as a drug prescribed with error. In addition, the total sum of the drugs contained in the prescriptions was measured, in order to total the data necessary for the applicability of the formula: (number of drugs prescribed with error / total number of drugs prescribed) x 100.

Data analysis: The study took place in a descriptive way and there was the help of

the EPI Info program developed by: *Centers for Disease Control and Prevention* (CDC, 2021) and Microsoft® Excel Office 2016. The PCNE V9.1 system was used to categorize and quantify the causes of DRP and FI. (2020). Obtaining all the information about the pharmacological data was guided by the studies of the*Micromedex®, WhiteBook®, SanfordGuide®*.

RESULTS

In all, 1,725 prescriptions were analyzed. From the total, 324 of them (18.78%) contained the FI. On average, 12.11 prescription drugs were analyzed and a total of 485 IF were performed for 20,893 drugs reviewed.

The causes of MRP found and their frequencies are shown in Table 1. The most frequent cause is related to inconsistencies in the drug dosage schedule or regimen (29.69%, n=144), followed by others, such as the inclusion or exclusion of medications and incompatibilities (27.42%, n=133). Furthermore, there are causes related to drug selection (7.42%, n=36), form of drug (19.58%, n=95) and logistics or dispensing process (15.87%, n=77).

The quantification and classification of the IF performed are described, according to table 2, as: correction of indications for duplicity of therapeutic effect (3.91%, n= 19), suspension of duplicate prescription (3.50%, n= 17), replacement with a more effective, safe or institutionally available pharmaceutical form (19.58%, n=95), dose adjustment according to the literature (11.95%, n=58) or dosage (17.73%, n=58) =86), inclusion of necessary information not prescribed or incorrectly prescribed (11.95%, n= 58), correction of dilution or serum therapy (4.12%, n= 20), suggestion of inclusion of medication (20.41%, n=99) or the suspension (6.80%, n=33).

After the identification of the causes of DRP and the consequent IF, the medical acceptability was recorded, as shown in table 3. There was adherence in 60.20% (n= 292) of the interventions proposed by the pharmacist and in 39.79% (n= 193) accession did not take place. Regarding the justification for medical non-adherence, in 83.93% (n= 162) there was no acceptability due to therapeutic non-compliance, assessment of the risk and benefit of pharmacotherapy or forgetting the prescriber. And in 16.06% (n=31) it was due to the patient's hospital discharge or death.

Then, the prescribing error rate indicator and identification of the impact of the prescription analysis on patient safety were estimated based on the formula described below: (number of wrong prescription drugs / total number of prescription drugs) x 100. The results of the indicators are described by classes and shown in table 4.

Causes of Drug-Related Problems	**n (%)**
Drug selection	36 (7,42)
Drug form	95 (19,59)
Dosage schedule or drug dosage regimen	144 (29,69)
Logistics or dispensing process	77 (15,88)
Others (inclusion or exclusion of drugs and incompatibilities)	133 (27,42)
Total	485 (100%)

Table 1. Main causes of Drug-Related Problems in a hospital unit in the specialty sector of the surgical clinic (Diamantina/ Minas Gerais, 2021).

Pharmaceutical interventions	**n (%)**
Correction of indications for duplicity of therapeutic effect	19 (3,92)
Duplicate prescription suspension	17 (3,50)
Replacement with the most effective, safe or available pharmaceutical form	95 (19,59)
Dose adjustment according to literature	58 (11,96)
Dosage adjustment according to literature	86 (17,74)
Inclusion of non-prescribed or incorrectly prescribed necessary information	58 (11,96)
Dilution correction and serum therapy	20 (4,12)
Suggestion of drug inclusion	99 (20,41)
Suggestion of discontinuation of medication (medication unnecessary)	33 (6,80)
Total	485 (100)

Table 2. Quantification and classification of pharmaceutical interventions performed in a hospital unit in the specialty sector of the surgical clinic (Diamantina/ Minas Gerais, 2021).

Medical Acceptability of Pharmaceutical Interventions	**n (%)**
Adherence	292 (60,20)
non-adherence	193 (39,80)
Non-adherence due to hospital discharge or death	31 (16,06)
Non-membership for other reasons	162 (83,94)
Total	485 (100)

Table 3. Adherence of the clinical staff to pharmaceutical interventions performed in a hospital unit in the specialty sector of the surgical clinic (Diamantina/ Minas Gerais, 2021).

Prescription error rate	**n (%)**
drug selection	0,17 (7,42)
drug form	0,45 (19,60)
Dosage schedule or drug dosage regimen	0,68 (29,70)
Logistics or dispensing process	0,36 (15,88)
Others (inclusion or exclusion of drugs and incompatibilities)	0,63 (27,43)
Total	2,32 (100)

Table 4. Prescription error rate indicator, in a hospital unit in the specialty sector of the surgical clinic (Diamantina/ Minas Gerais, 2021).

DISCUSSION

The average of 12.11 drugs prescribed daily per patient is in agreement with the research by VIANA et al. (2017), however, presented a result well above the average of other studies, as shown in ALBUQUERQUE (2011), with an average of 7.5, as well as that of COSTA (2019), with 4.47 and the one recommended by the World Health Organization (WHO, 1993) of 2.0 prescription drugs. This result demonstrated the excessive prescription of drugs, so that pharmaceutical performance has become even more important in the identification of possible reactions and/or pharmacological interactions (COSTA et al., 2019).

The most frequent cause of MRP identified was related to the dose schedule or drug dosage regimen, representing 29.69%, a higher percentage when compared to the study by CRUZ et al. (2019) with 10.3% and lower compared to AGUIAR et al. (2018) with 32.1%. The prescription of a sub- or over-dose, as well as mistakes related to the dosage of the drug, can bring harm, such as decreasing the efficacy and safety of pharmacotherapy, prolonging the hospital stay, causing adverse effects, intoxication, pharmacological dependence, masking symptoms and even worsening the clinical condition of patients (GONGALVES et al., 2020; QUALHATO et al., 2020; REIS et al., 2013).

The second largest cause of MRP identified was related to the inclusion or exclusion of drugs and incompatibilities, with a percentage of 27.42%. According to the results of this research and studies found in the literature, it is believed that this cause may be related, mainly, to the pharmaceutical clinical service of Reconciliation of Medicines, in which it seeks to include medicines for home use in hospital prescriptions and/or or adjust them according to interactions and compatibilities of other prescribed drugs (GUO et al., 2020; SILVA et al., 2021).

Regarding FI, the inclusion of drugs in therapy (20.41%), drug substitution (19.58%) and dose adjustment (17.73%) were the most recurrent in this study and are in accordance with the others. recent studies (BARROS et al., 2021; MATSUNAGA et al., 2019; SILVA et al., 2018). According to CRUZ et al. (2019), the substitution of the drug for another presentation or pharmaceutical form that is more effective, safe or available in an institution represented the second highest frequency in pharmacological intervention, in line with the results obtained in this research.

The irrational or mistaken use of medicines is still a major public health problem, therefore, the clinical pharmacy service has become essential in avoiding inadequacies that, if not carried out, could delay and even worsen the clinical condition. of the patient (BARROS et al., 2021; PRADO et al., 2017). The results found in the literature demonstrate that the pharmacist's role in the analysis of prescriptions acts proportionally in the reduction of prescription errors and, consequently, pharmacological interactions and adverse events (BARROS et al., 2021; VIANA et al., 2017).

In view of the interventions proposed by pharmacists, there was a 60.20% adherence by physicians, a percentage slightly lower than that found by VIANA (2017) and BARROS et al. (2021). The data found showed that medical adherence has a low percentage, so that it is essential to demonstrate to the clinical staff the importance of the joint action of the entire multiprofessional health team. However, these studies also demonstrate that, although medical acceptability has a low percentage, the clinical performance of the pharmaceutical professional has been increasingly inserted and accepted in the hospital context, in order to contribute and

assist in the integral care of the patient. (BARROS et al., 2021; CRUZ et al., 2019; SILVA et al., 2021).

All analyzed drugs that required interventions were classified according to the *AnatomicalTherapeuticChemical* (ATC). The data obtained showed that drugs that act on the central nervous system, such as antipsychotics, antidepressants, anxiolytics and opioids, presented high frequencies among the interventions, in agreement with the studies developed by CORRER (2007) and SALDANHA (2020). According to the WHO, these drugs are chemical substances that act by altering the patient's psychological and physiological functions, so that they can also promote psychological dependence (WHO, 1993). Inconsistencies related to this class of drugs, therefore, become extremely dangerous and can cause serious health problems, given the need for pharmaceutical care (PRADO et al., 2017).

According to the data obtained in the present study and under the guidance of the PNSP protocol, among a total of 100 prescription drugs, in 2.32 drugs there is at least one prescription error. This percentage was lower when compared to that found by AGUIAR et al. (2018) with 4.5% and higher than the percentage found by MATTSSON et al. (2015) of 1.6%. The study developed by FERNANDES (2019) showed a rate above 65%. The author emphasizes that this high percentage may be related to manual prescriptions and emphasizes that the use of electronic systems can considerably reduce the occurrence of errors. In the literature, there are few studies on a rate established as a reference, and the ideal average incidence must be established in each institution, for a better understanding of the institutional reality and in the construction of strategies that minimize the error rate (AGUIAR et al., 2018; FERNANDES, 2019).

As already demonstrated by other authors, it is believed that the results of this research contribute to identifying the role of the pharmacist as decisive to establish actions that minimize any events that may interfere with the pharmacotherapeutic management, in addition to demonstrating the importance of the professional for the rational use of drugs. medicines and patient safety (CRUZ et al., 2019; TORRES et al., 2021).

As a limitation of the study, it can be mentioned that the prescriptions analyzed correspond to only one sector within the hospital unit and, therefore, may not reflect the total reality of the institution.

CONCLUSION

In view of the results achieved, it was possible to observe that the pharmaceutical clinical service of prescription analysis contributes significantly to the reduction of DRP, in view of the resolute actions that aim directly at improvements in patient safety, reduction of hospitalization time, therapeutic success and care. of patients, especially in the health of the elderly population.

REFERENCES

AGUIAR, KS. *et al.* **Segurança do paciente e o valor da intervenção farmacêutica em um hospital oncológico.** Einstein, São Paulo. v.16, n.1, p.1-7. 2018. Doi: 10.1590/S1679-45082018AO4122.

BARROS ME; ARAÚJO IG. **Evaluation of pharmaceutical interventions in an intensive care unit of a teaching hospital.** Revista Brasileira de Farmácia Hospistalar e Serviços de Saúde. v.12, n.3, p.0561. 2021. Doi: https://doi.org/10.30968/rbfhss.2021.123.0561.

BASILE, LC. *et al.* **Análise das ocorrências de incidentes relacionados aos medicamentos potencialmente perigosos dispensados em hospital de ensino.**Revista Gaúcha de Enfermagem**,** Porto Alegre. v.40. 2019. Doi: https://doi.org/10.1590/1983-1447.2019.20180220.

BRASIL**.** Conselho Federal de Farmácia. **Resolução nº** 585, de 29 de agosto de 2013. **Regulamenta as atribuições clínicas do farmacêutico e dá outras providências**. Diário Oficial da União, 2013.

CDC, **Centers for Disease Control and Prevention,** 2021**.** Disponível em: <https://search.cdc.gov/search/index.html?query=epiinfo&sitelimit=&utf8=%E2%9C%93&affiliate=cdc-main>. Acesso em: 05 de junho de 2021.

CORRER, CJ. *et al.* **Riscos de problemas relacionados com medicamentos em pacientes de uma instituição geriátrica.** Revista Brasileira de Ciências Farmacêuticas. v.43, n.1, p.55-62. 2007.

COSTA, DB. *et al.* **Erros de prescrição de medicamentos: uma avaliação da prescrição na pediatria de um hospital escola.** Revista Brasileira de Farmácia Hospitalar e Serviços de Saúde. v.9, n.2, p.01-05, 2019. Doi: 10.30968/rbfhss.2018.092.002.

CRUZ, LT; BATISTA, PN; MEURER, IR. **Análise do serviço de farmácia clínica em um hospital universitário**. HU Revista. v.45, n.1, p.13-21. 2019.

DIAS, D. *et al*. **Avaliação de intervenções clínicas farmacêuticas em uma UTI de um hospital público de Santa Catarina**. Revista Brasileira de Farmácia Hospitalar de Serviços de Saúde. v.9, n.3, p.1-5. 2019. Doi: 10.30968/rbfhss.2018.093.005.

FERNANDES, FCG. **Uso de indicadores de segurança do paciente na análise das etapas de prescrição e dispensação de medicamentos.** Dissertação de mestrado profissional - Universidade Federal Fluminense, Niterói. 2019. Doi: https://app.uff.br/riuff/handle/1/11098.

GARIN, N. *et al.* **Drug related problems in clinical practice: a cross-sectional study on their prevalence, risk factors and associated pharmaceutical interventions.** Scientific Reports11. n.883. 2021. Doi: https://doi.org/10.1038/s41598-020-80560-2.

GONÇALVES, MF. *et al.* **Prescrição médica e o uso irracional de medicamentos: uma revisão bibliográfica.** Revista Bioética Cremego. v.1, n.1, p.55-60. 2020.

GUO, Q. *et al.* **The role of clinical pharmacist trainees in medication reconciliation process at hospital admission.** International Journal of Clinical Pharmacy. v.42, n.2, p.796-804. Mar/2020. Doi: 10.1007/s11096-020-01015-2.

HAILU, BY. *et al***. Drug related problems in admitted geriatric patients: the impact of clinical pharmacist interventions**. BMC Geriatrics. v.20. 2020. Doi: https://doi.org/10.1186/s12877-020-1413-7.

ISMP. **Programa Nacional de Segurança do Paciente: indicadores para avaliação da prescrição, do uso e da administração de medicamentos – Parte II.** v.5, n.2. 2016.

MATSUNAGA, PAS; PENHA, RM; POLISEL, CG. Avaliação da taxa de erro de prescrição de medicamentos em uma instituição hospitalar. O mundo da saúde, São Paulo. v.43, n.3, p.732-746. 2019. Doi:10.15343/0104-7809.20194303732746.

MATTSSON, TO. **Non-intercepted dose errors in prescribing anti-neoplastic treatment: a prospective, comparative cohort study.** Annals of Oncology. v.26, n.5, p.981–986. 2015.

NUNES, BM; XAVIER, TC; MARTINS, RR. **Problemas relacionados a medicamentos antimicrobianos em unidade de terapia intensiva neonatal.** Revista Brasileira de Terapia Intensiva, São Paulo. v.29, n.3, p.331-336. 2017. Doi: https://doi.org/10.5935/0103-507X.20170040.

ORGANIZAÇÃO MUNDIAL DE SAÚDE (OMS). **Como investigar el uso de medicamentos em los servicios de salud. Indicadores seleccionados del uso de medicamentos**. Ginebra, 1993.

PCNE - **Classification for Drug-RelatedProblems V9.1,** 2020 - Disponível em: <https://www.pcne.org/upload/files/417_PCNE_classification_V9-1_final.pdf>.Acesso em: 05 de junho de 2021.

PRADO, MAMB; FRANCISCO PMSB; BARROS, MB. El uso de fármacos psicotrópicos en adultos y ancianosen Campinas, São Paulo, Brasil: unestudio transversal basado em la población. Revista de *Epidemiologia* e *Serviços* de *Saúde*. v.26, n.4, p.747-758. 2017. Doi: https://doi.org/10.5123/S1679-49742017000400007

QUALHATO, DA. *et al.* **O uso irracional de medicamentos e suas consequências**. Faculdade de Inhumas FacMais. 2020.

REIS, WC. *et al.* **Análise das intervenções de farmacêuticos clínicos em um hospital de ensino terciário do Brasil.** Einstein. v.11, n.2, p.190-196. 2013. Doi: 10.1590/S1679-45082013000200010.

SALDANHA, V. **Problemas relacionados a medicamento em pacientes admitidos em Hospital Geral de Ensino: incidência, caracterização e fatores de risco**. Tese (Doutorado em Ciências Farmacêuticas) - Centro de Ciências da Saúde, Universidade Federal do Rio Grande do Norte, Natal. 2020.

SILVA, ACS. *et al.* **Acompanhamento farmacoterapêutico em unidade de terapia intensiva respiratória: descrição e análise de resultados.** Einstein. v.16, n.2, p.1-7. 2018.

SILVA, TB; ALVES-ZARPELON, SP; LAUREANO, JV. **Conciliação medicamentosa em uma unidade de internação de hospital público do sul do Brasil. Infarma - Ciências Farmacêuticas.** v.33, n.2, p.158-166. 2021. Doi: http://dx.doi.org/10.14450/2318-9312.v33.e2.a2021.pp158-166.

SOUZA, LB. *et al.* **Importância do farmacêutico clínico no uso seguro e racional de medicamentos no âmbito hospitalar**. Pensar Acadêmico, Manhuaçu. v.16, n.1, p.109-124. 2018. Doi: https://doi.org/10.21576/pa.2018v16i1.360.

TORRES PC. *et al.* **Experiências de usuários de um centro de informação de medicamentos sobre a atuação do profissional farmacêutico.** Revista Brasileira de Farmácia Hospitalar e Serviços de Saúde. v.12, n.3, p. 617. 2021. Doi: 10.30968/rbfhss.2021.123.0617.

VIANA, SS; ARANTES, T; RIBEIRO, SC. **Intervenções do farmacêutico clínico em uma Unidade de Cuidados Intermediários com foco no paciente idoso**. Einstein. v.15, n.3, p.283-288. 2017. Doi: 10.1590/S1679-45082017AO3894.