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RESEARCH ARTICLE

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## ANALYSIS OF PRESCRIPTION ERRORS IN A HOSPITAL IN THE SOUTHERN REGION OF TOCANTINS

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### ABSTRACT

The prescription is the bridge between diagnosis and treatment of the patient. To be effective and safe this document must be clear, complete, and rational. To analyze prescription errors in the Orthopedics, Obstetrics, and Intensive Care Unit (ICU) of the Reference Hospital of Gurupi - TO. This is a cross-sectional, documental, descriptive, and retrospective study of medication prescription analysis. Data were collected from the second copies of prescriptions of patients admitted to the Orthopedics, Obstetrics, and ICU sectors from October 1 to November 30, 2021. During the proposed period, 2,642 prescriptions were analyzed, 5 and 8.4% of them were digitalized. Of the three sectors, the ICU prevailed with the best aspect regarding legibility and absence of erasures, which is justified by having 86% of digitalized prescriptions. 33% of the prescriptions did not show the patient's age, standing out the Obstetrics with the highest number of prescriptions, unlike the ICU and Orthopedics that had in their prescription model a field for this data. Regarding drug allergy, only (3. of 6%) of prescriptions were alerted to its presence; 93% of the prescriptions did not have the dose of all prescribed drugs, being a risk factor for the occurrence of medication errors. The use of acronyms was present in 94.8% of the prescriptions, which can cause misinterpretation. Prescription errors are a reality in the hospital environment, especially regarding the omission of information, putting the patient directly at risk and violating his/her safety.

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## INTRODUCTION

The prescription is the bridge between the diagnosis and the treatment of the patient. To have effectiveness and safety, this document must be clear, complete, and rational. Some estimates indicate that each hospitalized patient is subject to suffer at least one medication error per day, and most of them originate in the prescription stage, which may result in injury to the patient (NÉRI *et al.*, 2011; VIEIRA *et al.*, 2020; SILVA *et al.*, 2017a). Medication errors are avoidable episodes, which may or may not proceed in harm to the patient, longer time in the hospital environment, and higher expenses to the hospital (AGUIAR *et al.*, 2018). Among medication errors, there are prescription errors, which decrease the effectiveness of treatment and increase the potentiality of generating harmful consequences for patients (MATSUNAGA *et al.*, 2019). Prescription errors can be harmful to patients, therefore, to avoid these errors, the prescription must have the appropriate explicit doses and their defined intervals during the indicated treatment (ARAÚJO; UCHOA, 2011). The factors that may contribute to the occurrence of errors in prescriptions are the lack of standardization in the nomenclature of prescribed drugs, use of abbreviations, and presence of erasures (COIMBRA; CASSIANI, 2004). The illegibility of prescriptions is a major contributor to the occurrence of medication errors, causing losses and violating patient safety (COSTA *et al.*, 2018). Omitting data, and passing on incomplete information that generates doubt or even erroneous information increases the prevalence of such errors (SILVA *et al.*, 2017a).

Patient safety, understood as the mitigation of the risk of unnecessary harm accompanied by care has been identified as a priority icon of the quality of health systems worldwide (BRASIL, 2013a). Ordinance N° 2,095, of September 24, 2013, approved the Basic Protocols for Patient Safety establishing in Annex 03 the Protocol for Safety in Prescription, Use and Administration of Medications (BRASIL, 2013b). The main errors in the hospital environment that endanger patient safety are directly related to the prescription, administration, and use of medicines, and the challenge is to reduce such errors (VIEIRA *et al.*, 2020). The pharmaceutical intervention, facing the prescriptions, with monitoring of pharmacotherapy is essential to prevent medication errors occur, avoiding high costs for the hospital (AGUIAR *et al.*, 2018). It is also essential that the pharmacist double-checks the prescription, and has a pharmacological look to identify possible incompatibilities, drug interactions, and drug-related problems. They should seek to clarify all doubts with the prescriber and intervene if necessary to ensure the safe, rational, and effective use of medicines, preventing a prescription error from becoming a dispensing error (SBRAFH, 2017). Given the above, the objective of this work is to analyze the errors in the drug prescriptions of patients admitted to the Orthopedics and Obstetrics sector and to the Intensive Care Unit (ICU) of the Reference Hospital of Gurupi - TO, aiming to contribute to the reduction of errors and harm to the patient's health

## MATERIALS AND METHODS

This work is a cross-sectional, documental, descriptive, and retrospective study of medication prescription analysis. The research was conducted at the Hospital de Referência de Gurupi - TO (HRG), the data were collected from the second copies of the prescriptions of patients admitted to the Orthopedics, Obstetrics, and Intensive Care Unit (ICU) in the period from October 1 to November 30, 2021. Therefore, prescriptions from other sectors of the hospital that were not in the proposed period were excluded from this study. The variables under study followed the recommendations of the Protocol for Safety in Prescription, Use and Administration of Medicines of the Ministry of Health (BRASIL, 2013b), thus, the following points were evaluated: prescription data such as the type of prescription used, legibility, presence of erasures; patient data and signs of drug allergies; prescriber data; pharmacotherapy data such as adequate expression of doses, route of administration, specification in the prescription of dosage, dilution, use of vague expressions such as

medications prescribed "at medical discretion" and use of acronyms present in the prescriptions. The data were tabulated using the Microsoft Office Excel 2013 system, where the frequency and categories of prescription errors were calculated. The research project was approved by the Ethics Committee of the University of Gurupi - UnirG according to resolution 466/2012 of the National Health Council/Ministry of Health - CNS/MS registered under number CAAE 29367820.1.0000.5518.

## RESULTS AND DISCUSSION

During the study period, a total of 2,642 prescriptions were analyzed, referring to October and November 2021, from patients, admitted to the Orthopedics (1,332), Obstetrics (694), and Intensive Care Unit (616) of the Regional Hospital of Gurupi. The types of prescriptions analyzed are described in figure 1.

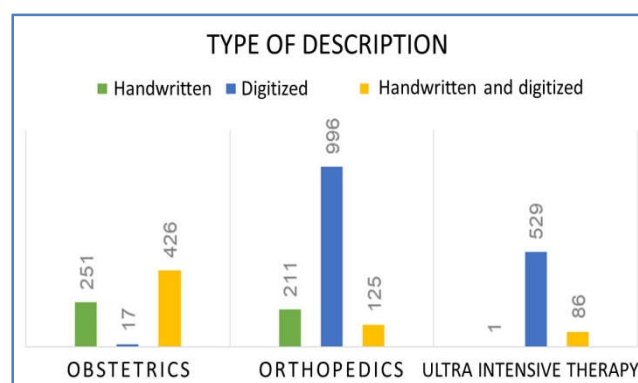


Figure 1. Distribution of prescriptions according to the type of prescription by sector

Of the 2,642 prescriptions it is possible to say that 58.4% (n = 1,542) were scanned, 17.5% (n = 463) were handwritten, and 24.1% (n = 637) were equivalent to handwritten and scanned prescriptions. In the article by Jacobsen *et al.* (2015), 2,687 prescriptions were evaluated, of which 70.3% (n = 1,889) were scanned, a value higher than that found in this research. Unlike Souza *et al.*, (2019) who observed that of 271 prescriptions only 8.11% were equivalent to the scanned ones. Rebouças *et al.*, (2017) analyzed that of the total of 7,800 prescriptions, only 24% (n = 1,866) were computerized prescriptions. It is evident the incidence of prescription errors is mainly due to the illegibility factor, accompanied by this information there is the idea of solving this problem with the use of digitalized or computerized prescriptions. However, it is possible to conclude that this is not yet a reality, since the handwritten form is still present, as obtained in this research in which 17.5% (n = 463) of the prescriptions had this form, prevailing in the Obstetrics sector with 251 prescriptions. As for the appearance of the prescriptions, they total 88.2% (n = 2,330) legible, 11.8% (n = 312) illegible, 11.8% (n = 312) erased, and 88.2% (n = 2,330) without erasures, as presented in figures 2 and 3.

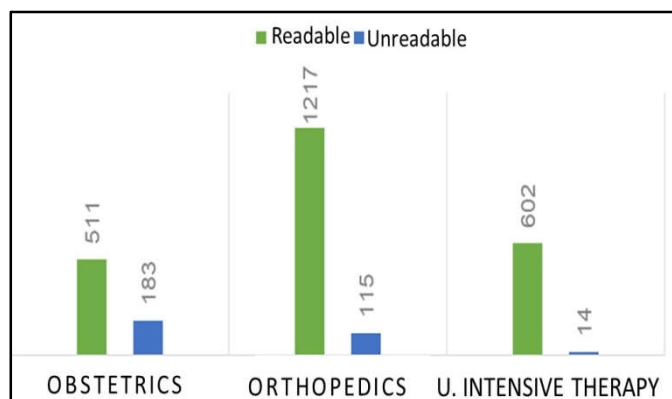
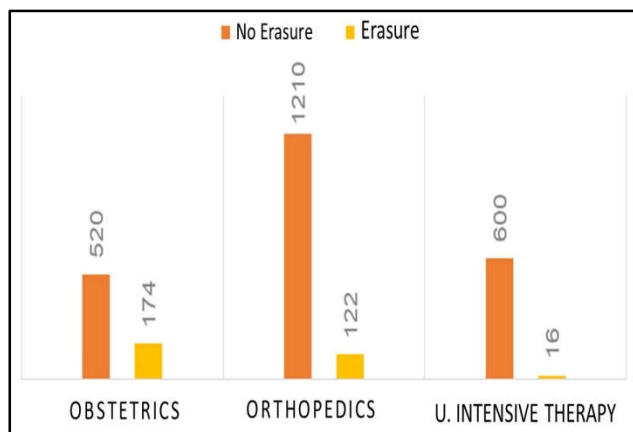


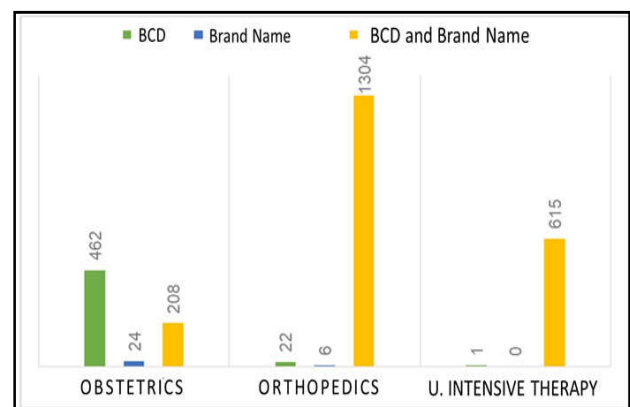
Figure 2. Distribution of prescriptions regarding the legibility of the prescription by sector



**Figure 3. Distribution of prescriptions regarding erasure of the prescription by sector**

Regarding illegibility and the presence of erasures, Rebouças *et al.*, (2017) found in their research that 37% (n = 2,874) of prescriptions were illegible and 8% (n = 1,272) erased, he justifies these values by the handwriting of the prescribers. Jacobsen *et al.*, (2015) totaled 13.2% (n = 354) of illegible prescriptions and 12.2% (n = 327) erased prescriptions, close to the values found in this research. The ICU analyzed in this study prevailed with the best aspect in readability and absence of erasures in the other sectors, which is justified by having 86% of scanned prescriptions. Obstetrics, with the highest number of handwritten prescriptions, 36% (n = 251), had the highest number of illegible (183) and erased (174) prescriptions. Ferreira *et al.*, (2021) in their recent study, addresses data related to prescription errors such as the lack of necessary information in the prescription. Costa *et al.* (2018) also emphasize that the omission of information in prescriptions is common and quite serious, whether regarding the identification of the patient, the prescriber, the bed, the diagnosis, or the prescribed medications. The patient's data such as sector, bed, name, age, diagnosis, and the warning whether or not there was an allergy are described in table 1. In relation to the total of 2,642 prescriptions: 81.2% (n = 2,144) had a sector, 95.6% (n = 2,527) had a bed, 99.8% (n = 2,638) had the name of the patient, 67% (n = 1,771) had the age of the patient, 96.1% (n = 2,540) described the diagnosis, in relation to drug allergy, only 3.6% (n = 96) prescriptions alerted to its presence. In the study developed by Babatunde *et al.* (2016), a total of 3,545 prescriptions were reviewed and the age of the patients was ignored in 59.3% of them. Costa *et al.*, (2018) evaluated 898 prescriptions and observed that 12.8% (n = 115) of these did not specify the age of the patient. Unlike the present study that analyzed 2,642 prescriptions, 33% (n = 871) did not present the patient's age, highlighting Obstetrics with the largest number of prescriptions (638), unlike the ICU and Orthopedics that by having in their prescription model a field for this data there was the absence in only 4.9% (n = 30) and 15.2% (n = 203) of prescriptions respectively. The identification of the patient is a piece of key information in the hospital environment since it reduces the chance of errors and exchanges, Silva *et al.*, (2017b) brings that of 175 prescriptions, 5 did not mention the name of the patient, while Pires; Santos (2016) analyzed that of 257 prescriptions, in 1.2% (n = 3) the name was not included. Less than that, this study obtained without the name of the patient, only 0.15% (n = 4) of prescriptions, of the total studied, and these were only from Obstetrics. Costa *et al.*, (2018) described that 1.2% of prescriptions did not have the inpatient sector, while the bed was absent in 80.5%. Contradictory to this data, this research noted that 18.8% (n = 498) of prescriptions did not have the sector and only 4.4% (n = 115) did not contain the bed, and of the three sectors Obstetrics had the highest rate in this data. The diagnosis of the patient present in this document enables better pharmaceutical action in case of exchange, suggestion, and intervention. Of the prescriptions evaluated, 3.9% (n = 102) did not contain this element, this value being lower than the finding of Shrestha; Prajapati (2019) where the non-mention of the diagnosis was equivalent to 39.2% (n = 302). In the data of Souza *et al.*, (2019) the informational elements regarding drug allergy were absent in the vast majority of prescriptions,

98.15%, which corroborates with the data of this research that of the 2,642 prescriptions, 96.4%, had no alert about this crucial factor for patient safety. Table 2 shows the fundamental prescriber data in the analyzed document in cases of doubts and possible interventions. Of all the prescriptions analyzed, 89.1% (n = 2,355) had the name of the prescriber, 97% (n = 2,564) had the Regional Medical Council number, 67.3% (n = 1,778) had the medical specialty, 97.5% (n = 2,576) were signed, 88.4% (n = 2,335) were stamped, and 97.5% (n = 2,576) had the date of the prescription. Mota *et al.*, (2021) observed in their findings that out of 352 prescriptions, the signature and the medical stamp were present in 99.1% and 97.7% respectively. Costa *et al.*, (2018) found that in 4.7% the full name of the prescriber was not present, while Shrestha; Prajapati (2019) obtained more severe results, as failure to mention the prescriber's name occurred in 87.5% (n = 674) and failure to mention the signature in 19.2% (n = 148). The date of prescription was detected in 98% of the records analyzed by Mota *et al.*, (2021). In their study, Souza *et al.*, (2019) noted the presence of date in 97.42% of the total prescriptions analyzed, which is similar to this research that 97.5% (n = 2,576) of prescriptions presented with this important data. Regarding the identification of prescribers, and analyzed practice, especially in the ICU sector, consisted in the association of the signature accompanied by the CRM number, which was handwritten, without the presence of the medical stamp in 37.3% of prescriptions. This practice causes losses when contacting the physician, and it is of fundamental importance the complete use of all data, to assist communication between professionals. The nomenclature of the drugs prescribed must follow the Brazilian Common Denomination (BCD), however, only in the Obstetrics sector did this rule prevail, as shown in figure 3. It is possible to state that only 18.4% (n = 485) of the 2,642 prescriptions had all the drugs prescribed with the correct denomination, DCB. The mixed prescription with drugs by the BCD and drugs with commercial or brand names was dominant, with 80.5% (n = 2,127) of the prescriptions. And 30 prescriptions equivalent to 1.1% had exclusively brand name drugs. In the study by Silva *et al.* (2017a), there were no medications prescribed with commercial or brand names, only with the BCD. The author claims this is because the establishment belongs to the Unified Health System (SUS), where legislation requires the use of this nomenclature, and also because the medical records are electronic, indicating the drug description and correct pharmaceutical form automatically. Pires; Santos (2016) in their study investigated some doctors on duty at the hospital in question about the use of the trade name in prescriptions and the justification gathered was that it is easier to prescribe by trade name than the advertising prepared by laboratory representatives and trust in them.



**Figure 4. Distribution of prescriptions regarding the nomenclature of the drugs prescribed by sector**

The pharmacotherapy of the prescriptions was analyzed for the presence and absence of fundamental data for the correct and safe treatment of the patient in its sector, as presented in table 3. About these data, 93% (n = 2,457) of the prescriptions did not have the dose of all prescribed drugs, as well as 98.5% (n = 2,603) of the prescriptions, did not have the description of the pharmaceutical form of each medication to be used.

Table 1. Distribution of the data of patients present and absent in each sector

PATIENT DATA	OBSTETRICS		ORTHOPEDICS		ICU	
	YES	NO	YES	NO	YES	NO
Sector	518 (74,6%)	176 (25,4%)	1011 (75,9%)	321 (24,1%)	615 (99,8%)	1 (0,2%)
Bed	603 (86,9%)	91 (13,1%)	1312 (98,5%)	20 (1,5%)	612 (99,4%)	4 (0,6%)
Name	690 (99,4%)	4 (0,6%)	1332 (100%)	0 (0%)	616 (100%)	0 (0%)
Age	56 (8,1%)	638 (91,9%)	1129 (84,8%)	203 (15,2%)	586 (95,1%)	30 (4,9%)
Diagnosis	616 (88,8%)	78 (11,2%)	1309 (98,3%)	23 (1,7%)	615 (99,8%)	1 (0,2%)
Drug Allergy	15 (2,2%)	679 (97,8%)	75 (5,6%)	1257 (94,4%)	6 (1,0%)	610 (99,0%)

Table 2. Distribution of prescriber data present and absent in each sector

PRESCRIBER DATA	OBSTETRICS		ORTHOPEDICS		ICU	
	YES	NO	YES	NO	YES	NO
Name	648 (93,4%)	46 (6,6%)	1310 (98,3%)	22 (1,7%)	397 (64,4%)	219 (35,6%)
CRM No.	650 (93,7%)	44 (6,3%)	1310 (98,3%)	22 (1,7%)	604 (98,1%)	12 (1,9%)
Specialty	584 (84,1%)	110 (15,9%)	1193 (89,6%)	139 (10,4%)	1 (0,2%)	615 (99,8%)
Signature	651 (93,8%)	43 (6,2%)	1316 (98,8%)	16 (1,2%)	609 (98,9%)	7 (1,1%)
Stamp	643 (92,7%)	51 (7,3%)	1306 (98,0%)	26 (2,0%)	386 (62,7%)	230 (37,3%)
Prescription date	650 (93,7%)	44 (6,3%)	1320 (99,1%)	12 (0,9%)	606 (98,4%)	10 (1,6%)

Table 3. Distribution of present and missing pharmacotherapy data by sector

PHARMACOTHERAPY DATA	OBSTETRICSTRICS			ORTHOPEDICS			ICU		
	YES	NO	NOT APPLICABLE	YES	NO	NOT APPLICABLE	YES	NO	NOT APPLICABLE
Dose	74 (10,7%)	620 (89,3%)		108 (8,1%)	1224 (91,9%)		3 (0,5%)	613 (99,5%)	
Route of administration	366 (52,7%)	328 (47,3%)		1291 (96,9%)	41 (3,1%)		611 (99,2%)	5 (0,8%)	
Diluent for injectables	136 (19,6%)	266 (38,3%)	292 (42,1%)	63 (5,0%)	1258 (94,0%)	11 (1,0%)	101 (16,4%)	515 (83,6%)	0 (0%)
Pharmaceutical Form	34 (4,9%)	660 (95,1%)		5 (0,4%)	1327 (99,6%)		0 (0%)	616 (100%)	
Dose interval	372 (53,6%)	322 (46,4%)		1289 (96,7%)	43 (3,3%)		614 (99,7%)	2 (0,3%)	
Abbreviation	589 (84,9%)	105 (15,1%)		1300 (97,6%)	32 (2,4%)		615 (99,8%)	1 (0,2%)	
Vague expressions	232 (33,4%)	462 (66,6%)		1175 (88,2%)	157 (11,8%)		593 (96,3%)	23 (3,7%)	

Legend: the diluent is not applicable in prescriptions with oral medications only.

In contrast, the dose range and route of administration were present concomitantly in 86.1% (n = 2,275) and 85.8% (n = 2,268) of prescriptions, standing out in these issues in the ICU. Souza *et al.*, (2019) presented even better results in their research, with 95.57% dose interval and 96.31% route of administration. The work of Shrestha; Prajapati (2019) presents that the most common medication omission error was the failure to mention the dose, which was 32.6% (n = 798), while the pharmaceutical form was omitted in only 4.5% (n = 110). Well, in the study of Matsunaga *et al.*, (2019) one of the most frequent errors was medication prescribed without the dose, 23.65% (n = 778), but without the pharmaceutical form was only, 1.31% (n = 43), values these lower compared to the data found in this study. The medication dose limits the safety of the treatment for the patient; omitting such information leads to error and exposes the patient to a high chance of overdose or even sub-therapeutic dose.

According to Fuchs; Wannmacher (2017), the absence of information about the dose is a risk factor for the occurrence of a medication error because it can lead the nurse or nursing technician to administer medication at an inappropriate dose for that particular drug. The diluent was only explicit for each prescribed medication in 12.8% (n = 300) of the prescriptions out of a total of 2,339 that contained injectable medications and required its specification. Oliveira *et al.*, (2018) in their research highlighted that the most frequent error was the omission of the diluent with 40%. The types of diluents were not described in 7.4% of the prescriptions analyzed by Costa *et al.*, (2018) and close to that, Matsunaga *et al.*, (2019) observed that without diluents were 6.57% of the prescriptions. These values are lower than the omission rate found in this research which was 87.2%, with prevalence for Orthopedics. Medications without the correct use of all the necessary information can cause misinterpretation.

The use of acronyms and vague expressions was present in this study is respectively 94.8% (n = 2,504) and 75.7% (n = 2000) of prescriptions, using expressions such as "if necessary", "if pain", "if nausea" and "SOS". Souza *et al.*, (2019) showed similarity in their work, were in 99.26% of the records, there was the use of acronyms (abbreviations). Brennan-Bourdon *et al.*, (2020) state that of 2,347 prescriptions, the use of abbreviations had a rate of 50.9%, and Matsunaga *et al.*, (2019) states that medications with vague expressions were only found in 8.03% (n = 264) of the prescriptions. Thus, it is possible to understand that the medical prescription is a determining factor for therapeutic success, being essential that there is adequate understanding so that the prescribed drug is dispensed and administered correctly (SILVERIO; LEITE, 2010). The participation of the pharmacist is a great barrier against such errors because before his previous analysis of the prescription he avoids, intervenes, and corrects them, thus helping to minimize possible damage to the patient (ARAÚJO; UCHÔA, 2011).

## FINAL CONSIDERATIONS

With this research it was possible to analyze that prescription errors are a reality in the hospital environment, especially regarding the omission of information, putting the patient directly at risk, and violating their safety. Emphasizes the importance of the professional pharmacist in the analysis of this document, ensuring the correct pharmacotherapy for the patient and, in cases of errors, performing the appropriate intervention. Implement the digitalized prescription in all sectors is a solution due to the errors reported in the Obstetrics sector, however, this is not the only way out in face of the errors analyzed in Orthopedics and ICU, so there should be the improvement in the digitalization system adopted, such as, for example, implementing the requirement to fill all necessary fields for



a safe prescription, avoiding absences, illegibility, erasures and confusion among professionals, in addition, the training and awareness of prescribing physicians is essential.

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