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Criteria for prioritizing hospitalized patients for clinical pharmacy services: a consensus proposal from a public hospital in Brasília

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Abstract

Objective: To determine the general patient prioritization criteria for the clinical pharmacy service at a public hospital in Brasília. **Methods:** This study was conducted in two stages. The first stage involved a narrative literature review of articles published, followed by a consensus meeting using the nominal group technique. Six clinical pharmacists working at the hospital participated in the consensus meeting. The meetin was organized in four phases: First, the findings from the literature review were presented, and a table of identified criteria was shared with all participants. Second, the group discussed and defined a list of the main prioritization criteria. After an initial consensus, the criteria were ranked by scoring the general factors for prioritizing hospitalized patients. **Results**: The literature review identified 22 articles, which led to an initial list of criteria categorized into three areas: health conditions (HC) – 9 items, laboratory monitoring (LM) – 21 tests, and pharmacological therapy (PT) – 7 items. Of these, 16 criteria were prioritized. The most significant criteria included: sepsis diagnosis (HC), criticality-related risk factors (HC), renal failure (LM), thromboembolism diagnosis (HC), polypharmacy (ten or more medications) (PT), multimorbidity (HC), use of potentially dangerous medications (PT), and medication errors (PT). **Conclusion**: The agreed-upon criteria describe critically ill patient profiles who require closer monitoring by the pharmacist and other healthcare team members, as well as enhanced technological infrastructure.

Keywords: hospitals; pharmacy service, hospital, patient selection, clinical pharmacy information systems

Critérios de priorização de pacientes hospitalizados para o serviço de farmácia clínica: uma proposta de consenso de um hospital público de Brasília

Resumo

Objetivo: Determinar critérios gerais de priorização de pacientes para o serviço de farmácia clínica de um hospital público de Brasília. **Métodos:** Foi realizada uma pesquisa dividida em duas etapas, sendo a primeira uma revisão integrativa da literatura de trabalhos publicados seguida de uma reunião de consenso por meio da técnica de grupo nominal. Participaram da reunião de consenso, seis farmacêuticos clínicos atuantes no hospital. A reunião de consenso foi organizada em quatro momentos, em um primeiro houve a exposição dos achados da revisão da literatura e a disponibilização a todos os participantes do quadro de critérios identificados. Em um segundo momento, os participantes do grupo realizaram a definição da lista dos principais critérios, após um primeiro consenso, foram priorizados por meio de pontuação dos critérios gerais de priorização dos pacientes hospitalizados. **Resultados:** a busca identificou 22 artigos que resultaram em uma lista inicial de critérios subdivididos em três categorias que estavam relacionados a condições de saúde-CS (9 itens); monitoramento laboratorial- ML (21 exames) e terapia farmacológica TF (sete itens). Destes critérios foram priorizados 16 itens, sendo os principais o diagnóstico de sepse (CS), fatores de risco relacionados a criticidade do paciente (CS), insuficiência renal (ML), diagnóstico de tromboembolismo (CS); polifarmácia igual ou superior a dez medicamentos (TF), multimorbidades (CS); uso de medicamentos potencialmente perigosos (TF) e erros de medicação (TF). **Conclusão:** Os critérios inicialmente consensuados descrevem um paciente em estado crítico e que precisa maior monitoramento do farmacêutico e de outros membros da equipe, bem como, uma estrutura tecnológica maior.

Palavras-chave: hospitais, serviço de farmácia hospitalar, seleção de pacientes, sistemas de informação em farmácia clínica

Introduction

Pharmacotherapeutic follow-up cannot always be provided daily to all patients admitted to hospital services due to a lack of available human resources. In this context, the importance of selecting and prioritizing patient follow-up to enhance patient safety is emphasized.[1] Accordingly, several studies have published prioritization tools to assist in training less experienced pharmacists, managing and planning workload, and thereby directing care toward complex patients requiring urgent pharmaceutical care.[2,3] Such tools are also useful for standardizing practices in clinical pharmacy services, particularly in settings with frequent staff rotation.

Patient prioritization criteria for pharmaceutical care are constructed using information involving pharmacological therapy (PT), such as the use of medications with a narrow therapeutic window, e.g., anticoagulants; the presence or absence of drug allergies; and the use of broad-spectrum antibiotics. [4] Additionally, criteria related to health conditions (HC)—including comorbidities, age, and organ dysfunction—may sometimes be identified through laboratory monitoring (LM). [5]

In this sense, prioritizing patient selection criteria may be important to identify which patients have the greatest need for pharmacist assistance to ensure the effectiveness and safety of pharmacological treatment; that is, which patients would benefit most from interventions aimed at reducing the risk of potential adverse events, medication errors, and unintentional discrepancies.[6] However, some difficulties are encountered in this process, such as the lack of relevant information regarding patient transfers and time-consuming activities such as patient discharge counseling.[7]

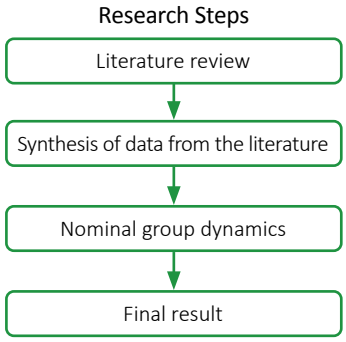
Thus, the objective of this study was to determine general patient prioritization criteria for the clinical pharmacy service of a public hospital in Brasília.

Methods

The selection of criteria was carried out in two stages. In the first stage, an integrative literature review (bibliographic survey) was conducted to support the second stage, which involved a nominal group technique, as illustrated in Figure 1. It is acknowledged that an integrative literature review does not have the power to synthesize evidence; however, it was adopted solely to gather data that could inform the second stage regarding the nominal group.

Initially, a bibliographic search was performed in the PubMed and Embase databases. The guiding question for the review was: "What prioritization tools and criteria are available for clinical pharmacists?" From this perspective, the descriptors chosen were "priority," "score," "hospital," "pharmacist," "pharmaceutical care," "pharmacy," "triage," "tool," "instrument," and "clinical pharmacy," combined with the Boolean operators AND and OR. Inclusion criteria were articles in English, Spanish, and Portuguese, selecting review articles and those focused on the development of prioritization instruments or criteria. Exclusion criteria included works in other formats, such as monographs, and those not available through the Capes Periodicals portal or other collections of the University of Brasília.

Figure 1. Representative flow of the research stages leading to the prioritization of criteria for selecting hospitalized patients for the clinical pharmacy service at a hospital in Brasília



A temporal delineation was established for the selection of new articles published between 2019 and 2024 (the year the present study was conducted). This was due to the adoption of the article "Prognostic prediction models and clinical tools based on consensus to support patient prioritization for clinical pharmacy services in hospitals: A scoping review"[3], which covered the previous period, including studies published up to 2019. In this case, we included Botelho *et al*.[3] and, based on that, additional studies identified from its reference list, considering the inclusion and exclusion criteria previously described.

Based on the review, a table was created containing the criteria from the studies surveyed and presented for the subsequent dynamics of developing patient prioritization criteria for pharmacists at a public hospital in Brasília. This initially developed table contained the prioritization criteria categorized by health condition, pharmacological therapy, and laboratory monitoring. In addition to the criteria, sub-criteria were described, understood as a detailing of the former, along with the list of references in which they were described.

The dynamics were carried out using the nominal group technique, adapted from the studies by Van de Ven and Delbecq[8] and by Olsen[9]. Six clinical pharmacists, who were available from the nine affiliated with the hospital's Clinical Pharmacy Core, participated in the group, in addition to a presenter, a mediator, and two observers. Data were collected from the pharmacists, such as length of clinical practice, education in the field, and professional expertise (type of patient usually attended to).

The hospital where the study was conducted is public and located in the city of Brasília. It is a referral hospital, featuring medical, surgical, gynecology and obstetrics, orthopedics, and pediatric wards. In the Federal District, it is considered a reference, especially in orthopedics and diabetes, with a focus on diabetic foot. The hospital currently has approximately 450 beds, including eight adult Intensive Care Unit (ICU) beds and four pediatric ICU beds.

Regarding the clinical pharmacy core, it was established in 2016, initially serving only the adult ICU with just one person involved. In the last decade, the number of pharmacists has expanded, many of them with lato sensu postgraduate degrees in clinical pharmacy and all with experience in caring for hospitalized patients. At the time of the research, as mentioned earlier, there were nine pharmacists affiliated with the core.

Stages of the nominal group session:

1. Problem definition with exposition of the review findings (in a table): This table, besides being projected, was made available to all participants via a QR code for consultation during the session. In this stage, the inclusion of new criteria was requested, if necessary.
2. Definition of the list of main criteria: Obtained through the silent generation of a list by each participant containing five criteria from the table.
3. First round of standardization and consensus: In this stage, a new table was created with a shorter list of criteria (obtained by systematizing the lists generated by each participant). During the process, participants received clarifications about the terms and their implications, in addition to standardizing the criteria by adopting terms considered most common and technically appropriate. At the end, the proposed list was agreed upon by all present.
4. Selection of priorities through criteria scoring (ranking): Based on the table with the main criteria, each participant was asked to again select five criteria they considered most important based on their clinical experience, assigning five points to the most important and giving lower scores down to the fifth criterion. Thus, the one considered most important received five points, and the others received four, three, two, and one point for the fifth criterion, sequentially. Consequently, by summing the scores assigned by participants to all criteria, the overall prioritized list was obtained. This list was evaluated for agreement by all participants, and no further rounds of selection and prioritization were necessary.

The results of the nominal group were presented as the initially listed and consensus-based criteria list (obtained in stage 3) and the prioritized table (with scores- stage 4). The nominal group technique was chosen over other techniques, such as focus groups and the Delphi technique, due to the agility of the process when compared to the Delphi technique, and the reduced possibility of interference from one of the workshop members, as could occur in a focus group.

This study was approved by the research ethics committee of FEPECS under registration (CAAE) 58120322.0.0000.5553.

Results

Nine studies were identified in the literature review. To these, the review by Botelho *et al*.[3] was manually added, and from it, another 12 articles were included. As previously addressed in the methods, the study by Botelho *et al*.[3] refers to a review that had already systematized prioritization criteria from studies published up to 2019. Thus, a total of 22 articles were used to construct the criteria table, which were divided into sub-criteria (Table 1). This initial list of criteria was subdivided into three categories related to health conditions (HC) (nine items); laboratory monitoring (LM) (21 tests); and pharmacological therapy (PT) (seven items).

Table 2 presents the profile of the nominal group participants, all of whom are pharmacists working at the hospital under study.

The criteria selected in the first stage of the nominal group were age, previous hospitalization, comorbidities, renal dysfunction, dysfunction of other organs, diagnoses, risk factors, high-alert medications, medications requiring monitoring, polypharmacy, and drug-related problems, as described in Table 3.

Table 4 presents the performance of the criteria in the scoring stage. From these criteria, 16 items were prioritized, the main ones being: diagnosis of sepsis (HC); risk factors related to patient criticality (HC); renal failure (LM); diagnosis of thromboembolism (HC); polypharmacy equal to or greater than ten medications (PT); multimorbidity (HC); use of high-alert medications (PT); and medication errors (PT).

Discussion

At the end of the dynamic process, the prioritization of a critically ill patient profile is evident. According to Ordinance No. 2.338 of October 2011, this refers to patients at imminent risk of losing their life or the function of an organ/body system and who require immediate care. These patients could be in wards or the emergency room, being referred to a more intensive care unit, such as an intensive care or intermediate care unit.

It is noteworthy that even though the request was for the prioritization of five criteria, the final list comprised 16 items. This may be related to different factors, such as the expertise and the type of patients each nominal group participant attends to; however, it confers a certain heterogeneity to the prioritized table. On the other hand, the clinical maturity of the group is observed in the final prioritization list, considering the focus on the patient's clinical condition, such as those with sepsis or criticality factors, rather than focusing exclusively on medication use.

Thus, for some authors like Spencer, Turner, and Garg, [11] patients with this profile, including those with hematology/oncology issues and those in pediatric and neonatal intensive care units, should be considered high priority, thereby requiring daily follow-up by the pharmacist through medication therapy review and laboratory monitoring.

Therefore, the inclusion of criteria demonstrating patient criticality, whether due to sepsis or risk factors for a more severe health condition, were considered the highest priority. Furthermore, Hickson *et al*.[4] and Chang *et al*.[21] add that both patients being transferred to intensive care units and those being discharged from these units to inpatient wards should be prioritized. However, in the present study, according to the profile, patients coming from units of higher criticality were not highlighted as a prioritization criterion.

The only criterion related to laboratory monitoring that was prioritized was creatinine clearance. This test is essential for assessing medications that are contraindicated or require adjustment for renal function. [28] However, it is important to note that other health conditions and medication interferences, such as diuretics that alter electrolyte levels, can cause changes in laboratory tests; therefore, their constant monitoring should be part of clinical practice, [29] even if they are not adopted in patient prioritization. An example of this can be observed in patients at risk of thromboembolism (a prioritized criterion), who, when using anticoagulants such as warfarin, should be monitored through coagulation tests, specifically the International Normalized Ratio (INR) and Prothrombin Time (PT). [30]

Furthermore, pharmacological therapy was considered in several prioritized criteria. This relates to the essence of clinical pharmacy services and is directly linked to ensuring patient safety. [31] It is observed that criteria such as polypharmacy in both home and hospital settings, the use of high-alert medications, those requiring monitoring, or those that have caused adverse events were prioritized in this study.

Table 1. Results of the narrative literature review on criteria for prioritizing patients in the hospital setting

Criteria	Subcriteria	References
Health Conditions – HC		
1. Age	0–18 years	Bernardez *et al.*[10]; Spencer; Turner; Garg[11]; Urbina *et al.*[12]; Botelho *et al.*[13]; Sharif-Askari *et al.*[14]; Clarke *et al.*[15]; Falconer *et al.*[16]; Nguyen *et al.*[17]; Abuzour *et al.*; Vallecillo *et al.*[2]; Roten[18]; Marty; Beney[19]
2. History of drug allergy/serious adverse event		Botelho *et al.*[13]; Kaufman *et al.*[15]; Clarke *et al.*[20]; Chang *et al.*[21]
3. Previous hospitalization	Up to 30 days	Botelho *et al.*[13]; Chang *et al.*[21]; Clarke *et al*[15].; Spencer; Turner; Garg[11]
4. Comorbidities	HIV; Epilepsy; Parkinson's disease; Tuberculosis; Blood pressure (>220 or <90 mmHg); Diabetes; Other chronic conditions; Hyperlipidemia	Hickson *et al.*[4]; Clarke *et al.*[15]; Weant *et al.*[15]; Botelho *et al.*[22]; Spencer; Turner; Garg[11]; Bernardez *et al.*[10]; Tangiisuran *et al.*[23]
5. Other organ dysfunction	Heart; Liver; Lung; Brain/bone marrow	Abuzour *et al.*[2]; Botelho *et al.*[13]; Chang *et al.*[21]; Hickson *et al.* [4] Chang *et al.*[21]; Hickson *et al.* [4] Kaufman *et al.* [20]; Covvey, Grant e Mullen[24]
6. Organ transplantation		Clarke *et al.* [15]; Hickson *et al.*[4]
7. Diagnoses	Chronic coronary disease; Open fracture; Cystic fibrosis; Urinary and renal tract diseases; Stroke/status epilepticus; Seizure; Chronic obstructive apnea; Heart failure; Uncontrolled hypertension; Neoplasm; Pneumonia; Sepsis; Meningitis; Endocarditis; Venous thromboembolism; Liver disease	Weant *et al.*[22]; Botelho *et al.*[13]; Urbina *et al.*[12]; Kaufman *et al.*[20]; Covvey, Grant e Mullen [25] Weant *et al.*[22] Clarke *et al.* [15]; Kaufman *et al.*[20] Covvey, Grant e Mullen[24] Weant *et al.*[22]; Clarke *et al.*[15] Spencer; Turner; Garg [11] Spencer; Turner; Garg[11] Spencer; Turner; Garg[11] Weant *et al.*[22]; Onder *et al.*[25] Winterstein *et al.*[26]; Weant *et al.*[22] Bernardez *et al.*[10]
8. Special population	Pregnant women; Female sex; Obese/underweight; Immunocompromised; Palliative care/pain control; Clinical trial patient; Recently marketed treatment	Chang *et al.*[21]; Clarke *et al.*[15] Vallecillo *et al.*[18] Chang *et al.* [21]; Botelho *et al.*[13] Chang *et al.*[21] Chang *et al.*[21]; Clarke *et al.* [15] Bernardez *et al.* [10] Bernardez *et al.* [10]
9. Risk factors for clinical severity	Glasgow Coma Scale; Mechanical ventilation; Sedation; Decompensated organ; Substance abuse; Post-cardiac surgery; Post-transplant; Hypodermoclysis; Parenteral nutrition	Botelho *et al.*[13]; Weant *et al.*[22]
Laboratory Monitoring – LM		
1. General laboratory tests	Positive C. difficile culture/toxin; Glucose; C-reactive protein; Serum albumin; Creatinine and GFR; Potassium; Sodium; WBC; RBC; Urea	Winterstein *et al.*[26]; Botelho *et al.*[13]; Falconer *et al.*[16] Sharif-Askari *et al.*[14]; Spencer; Turner; Garg[11] Sharif- Askari *et al.* [14]; Botelho *et al.* [13] Onder *et al.*[25]; Winterstein *et al.* [26]; Spencer; Turner; Garg[11] Winterstein *et al.*[26]; Spencer; Turner; Garg [11] Winterstein *et al.* [26]; Spencer; Turner; Garg [11] Tangiisuran *et al.*[23]
2. Renal dysfunction	Chronic kidney disease; Renal failure (CrCl <60 or <30 mL/min); Acute kidney injury	Abuzour *et al.*[2]; Botelho *et al.*[13] Kaufman *et al.*[20]; Roten; Marty; Beney[19]; Falconer *et al.*[16]; Covvey, Grant e Mullen[24]; Saedder *et al.*[28]
Pharmacological Therapy – PT		
1. High-alert medications	IV potassium; Narcotics and sedatives; Cytotoxic agents; Intrathecal/epidural agents; Neuromuscular blockers; Methadone; Levodopa/Carbidopa; Antiretrovirals; Insulin; Opioids; Clozapine; Antineoplastics; Narrow therapeutic index drugs; Corticosteroids; Antiepileptics	Spencer; Turner; Garg [11] Bernardez *et al.* [10] Hickson *et al.*[4] Spencer; Turner; Garg [11]; Bernardez *et al.* [10]; Hickson *et al.*[4]; Kaufman *et al.*[20]; Covvey, Grant e Mullen [24] Kaufman *et al.* [20]; Roten; Marty; Beney [19]; Covvey, Grant e Mullen [24]; Falconer *et al.* [16]; Spencer; Turner; Garg [11]; Hickson *et al.* [4] Hickson *et al.*[4]; Kaufman *et al.*[20]; Covvey, Grant and Mullen[24]; Falconer *et al.*[16]; Abuzour *et al.*[2]

Criteria	Subcriteria	References
2. Drug characteristics	Hepatotoxic; Nephrotoxic; QT-prolonging drugs	Winterstein *et al.* [26]; Botelho *et al.*[13]
3. Drugs requiring monitoring	Aminoglycosides; Glycopeptides; Antituberculars; Biologics; Iron sucrose; Immunoglobulin; PCC; Valproic acid; Amikacin; Carbamazepine; Lithium; Clozapine; Digoxin; Phenytoin; Phenobarbital; Gentamicin; Methotrexate; Vancomycin; Sirolimus; Tacrolimus; Busulfan; Voriconazole	Chang *et al.*[21]; Botelho *et al.*[13]
4. Antidote prescription	Acetylcysteine; Folic acid; Anti-digoxin antibody; Activated charcoal; Vitamin K; Flumazenil; Naloxone; Protamine	Botelho *et al.*[13]; Weant *et al.*[22]
5. Polypharmacy		Chang *et al.* [21]; Vallecillo *et al.*[18]; Botelho *et al.*[13] Bernadez *et al.* [10] Clarke *et al.* [15]; Abuzour *et al.*[2] Botelho *et al.*[13]
6. High-cost medication use		Hickson *et al.*[4]; Chang *et al.*[21]
7. Drug-related problems	Adverse events; Drug interactions; Non-adherence; Medication errors; Administration errors; Subtherapeutic dose	Chang *et al.* [21]; Botelho *et al.*[13]; Bernadez *et al.*[10]; Clarke *et al.*[15]; Abuzour *et al.*[2]

Abbreviations: HC – Health Conditions; PT – Pharmacological Therapy; LM – Laboratory Monitoring; GFR – Glomerular Filtration Rate; IV – Intravenous. Values: Glycated hemoglobin (HbA1c) >7%; Glucose < 70 mg/dL and > 140 mg/dL; Albumin < 2.5 g/dL; Positive C. difficile; Hemoglobin drop > 25%; Neutrophil count < 1.5 x 10^9/L; Platelets < 50 x 10^9/L; Leukocytes < 3 x 10^9/L; Leukocytes > 10 x 10^9/L; Glomerular filtration rate < 30 mL/min; INR < 1.5 or INR > 4.0 (2-3); INR < 2.0 or > 4.5 (2.5-3.5). Glucose of 198 mg/dL or < 72 mg/dL; HbA1c > 64 mmol in the last 90 days; Positive culture for C. difficile in the last 5 days; Hemoglobin drop of 25%; Potassium < 3 or > 6 mmol/L in the last 5 days; Sodium < 125 or > 155 mmol/L in the last 5 days; Troponin > 300 ng/mL in the last 5 days; White blood cells < 3 x 10^3/mm³ or neutrophil count of 1.5 x 10^3/mm³ in the last 5 days; INR > 3.5 or Prothrombin Time > 100 seconds or 2 consecutive INRs < 1.5 or Prothrombin Time of 60 seconds in the last 5 days.

Table 2. Professional profile of pharmacists participating in the nominal group for prioritization of criteria for patient selection in clinical pharmacy services

ID	Years of professional practice as a pharmacist	Years of experience in clinical pharmacy	Education/Training	Expertise
1	10 years	10 years	Residency in Hematology and Hemotherapy; Hospital Clinical Pharmacy; Oncology	Intermediate care unit and internal medicine
2	10 years	6 years	Residency in Cardiopulmonary Care; Master's in Clinical, Hospital and Healthcare Industry Management	Cardiology unit
3	16 years	10 years	Clinical Pharmacology; Palliative Care	Pediatric ICU, Palliative Care and Emergency Department
4	27 years	8 years	Specialization in Pharmacology; Clinical pharmacy training courses (SES)	Internal Medicine and Adult ICU
5	3 years	3 years	Specialization in Clinical and Forensic Toxicology	Orthopedic Emergency Department
6	2 years	2 years	Specialization in Clinical and Hospital Pharmacy	-

Abbreviation: SES – State Health Department.

It is important to note that polypharmacy appeared twice among the prioritization criteria, but considering only the home context, since polypharmacy is extremely frequent in the hospital setting. In this sense, priority should initially be given to individuals using ten or more medications at home, and, if possible, at a later stage, also consider those using five or more.

The idea of the prioritized list is to follow the order of the parameters, rather than performing a calculation or score with a final classification. In this sense, it is suggested that patients who should initially be followed up are those with sepsis. If possible, the pharmacist should subsequently prioritize those with factors that make them critical, then those with renal impairment, followed by those diagnosed with thromboembolism, and then those using ten or more medications at home, and so forth.

Furthermore, a review of tools, such as those described by Alshakrah *et al*., [32] can be conducted to enhance the findings of this study.

It is noteworthy that even though it was not scored in the nominal group, previous hospitalization with multiple readmissions was listed among the prioritized criteria. This patient should be followed up to identify preventable causes of new admissions, so that actions are taken, especially at hospital discharge, such as guidance on access to medications, medication reconciliation, education, and resolution of drug-related problems. [33]

This study has limitations. One is the possibility that some studies were not located through the search strategy, which may have led to the non-identification of some criteria already described in the literature, in addition to the heterogeneity observed among participants regarding the prioritization criteria.

Table 3. Criteria pre-selected as most important from the perspective of clinical pharmacists at a public hospital in Brasília

Criteria	Subcriteria
Health Conditions – HC	
1. Age	
2. Previous hospitalization	
3. Comorbidity	
4. Other organ dysfunction	Heart
5. Diagnosis	Sepsis and venous thromboembolism
6. Risk factors for clinical severity	Mechanical ventilation; Sedation; Decompensated organ; Substance abuse; Post-cardiac surgery; Post-transplant; Hypodermoclysis; Parenteral nutrition; Glasgow Coma Scale < 8
Pharmacological Therapy – PT	
1. High-alert medications	IV potassium; Opioids
2. Drugs requiring monitoring	Aminoglycosides and glycopeptides; Antitubercular drugs; Biologics; Iron sucrose; Immunoglobulin; Prothrombin complex concentrate; Valproic acid; Amikacin; Carbamazepine; Lithium carbonate; Clozapine; Digoxin; Phenytoin; Phenobarbital; Gentamicin; Methotrexate; Vancomycin; Sirolimus (rapamycin); Tacrolimus; Busulfan; Voriconazole
3. Polypharmacy	
4. Drug-related problems	Adverse events and medication errors
Laboratory Monitoring – LM	
1. Renal dysfunction	Renal failure (CrCl < 60 mL/min or < 30 mL/min); Acute kidney injury (Creatinine > 2.2 mg/dL or > 2× baseline in the last 5 days)

Abbreviations: HC – Health Conditions; PT – Pharmacological Therapy; LM – Laboratory Monitoring; IV – Intravenous.

Furthermore, the selected criteria indicate critically ill patients and may not be the most applicable to a group of patients with lower complexity. In this sense, it is suggested that the group proposing this research conduct further studies to define specific prioritization criteria for patients with different clinical profiles, for example, pediatrics, cardiology, and orthopedics. It is also highlighted that the pharmacists were from a single hospital and from different specialties and hospital units, which is why the criteria were not the same as in other studies and exhibited heterogeneity in the selection of these priorities, possibly resulting from the different expertise of the participating clinical pharmacists. In this case, the study serves more to demonstrate a prioritization methodology than to assume external validity and be applied in other hospitals. However, it is estimated that it will be applied in the units with the highest demand at the study hospital to assess its applicability.

On the other hand, it is emphasized that conducting studies of this nature helps standardize practices in more complex clinical pharmacy services, where multiple professionals work in different units within the same hospital. Furthermore, there is a need for tools developed from prioritization to be automated so that the identification of patients with priority criteria is quickly indicated. Thus, the presence of pharmacists from the units is essential for developing future instruments to achieve greater sensitivity and applicability of the criteria.

Conclusion

Prioritization criteria guide less experienced clinical pharmacists and those with higher demands for patient assessment. In this study, critically ill patients were identified as priorities, requiring closer involvement from the pharmacist in these situations, but also from other members of the healthcare team, as well as the availability of laboratory monitoring and sometimes more technologically advanced devices. Furthermore, it is important to emphasize that besides these patients, each unit should have its own prioritization instrument, given the different clinical profiles.

Additionally, it is highlighted that the listed criteria should be analyzed in the order they were prioritized and applied according to the pharmacist's service capacity. In this sense, patients with a diagnosis of sepsis should be selected first, followed by those with risk factors for criticality, then those with renal problems, and so on, applying the criteria and sub-criteria.

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Contributors

JEBA - study conception, data analysis and interpretation, article writing. CEFBG - data analysis and interpretation, critical review with significant individual contribution. DG - study conception, critical review with significant individual contribution.

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Conflict of Interest Declaration

The authors declare no conflicts of interest related to this article.

Table 4. Classification of prioritization criteria for selecting hospitalized patients for clinical pharmacy service follow-up in a public hospital in Brasília

Criteria	Subcriteria	Priority	Rank
HC – Diagnosis	Sepsis	19 points	1
HC – Risk factors for clinical severity	Mechanical ventilation; Sedation; Decompensated organ; Substance abuse; Post-cardiac surgery; Post-transplant; Hypodermoclysis; Parenteral nutrition; Glasgow Coma Scale < 8	13 points	2
LM – Renal dysfunction	Renal failure (CrCl < 60 or < 30 mL/min); Acute kidney injury (Creatinine > 2.2 mg/dL or > 2× baseline in last 5 days)	9 points	3
HC – Diagnosis	Venous thromboembolism	6 points	4
PT – Polypharmacy		6 points	5
HC – Multimorbidity		5 points	6
PT – High-alert medications	IV potassium; Opioids and sedatives; Cytotoxic agents; Intrathecal/epidural agents; Neuromuscular blockers	5 points	7
PT – Drug-related problems	Medication errors	5 points	8
HC – Age		4 points	9
PT – Polypharmacy (home use)		3 points	10
PT – High-alert medications	Oral and injectable anticoagulants	3 points	11
HC – Other organ dysfunction	Heart (reduced contractility, impaired diastolic function, severe arrhythmias, reduced cardiac output, myocardial ischemia, cardiogenic shock; consider persistent hypotension, tachycardia or bradycardia, signs of poor perfusion, dyspnea, peripheral edema, pulmonary crackles, and use of vasoactive drugs)	3 points	12
PT – Drug-related problems (safety)	Adverse event	2 points	13
HC – Comorbidities	Immunocompromised	1 point	14
PT – Drugs requiring monitoring	Aminoglycosides and glycopeptides; Antitubercular drugs; Biologics; Iron sucrose; Immunoglobulin; Prothrombin complex concentrate; Valproic acid; Amikacin; Carbamazepine; Lithium carbonate; Clozapine; Digoxin; Phenytoin; Phenobarbital; Gentamicin; Methotrexate; Vancomycin; Sirolimus; Tacrolimus; Busulfan; Voriconazole	1 point	15
HC – Previous hospitalization		0 points	16

Abbreviations: HC – Health Conditions; PT – Pharmacological Therapy; LM – Laboratory Monitoring; IV – Intravenous.

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