Revista Científica Escola de Saúde Pública do Ceará Paulo Marcelo Martins Rodrigues
1808-7329 (1809-0893)

ORIGINAL ARTICLE
Public / Collective Health

FLOW OF DRUG ALLERGIES IN PEDIATRICS: A DESCRIPTIVE STUDY

FLUXO DE ALERGIAS MEDICAMENTOSAS NA PEDIATRIA: UM ESTUDO DESCRITIVO

FLUJO DE ALERGIAS A MEDICAMENTOS EN PEDIATRÍA: UN ESTUDIO DESCRIPTIVO

Vanda Frota Coelho[1], *Diogo Thomas Ferreira de Lima*[2], *Tiago da Silva Nogueira*[3], *Maria de Fátima Menezes Azevedo*[4], *Luciana Macatrão Nogueira Nunes*[5], *Eudiana Vale Francelino*[6], *Karla Deisy Morais Borges*[7]

ABSTRACT
Introduction: The flow of care within drug allergies has been an enlightening process when the intention is to promote better quality in the diagnosis of pediatric patients. The Center for the Study of Medication and Food Allergy (CEAMA) has been in partnership for some time now with its theoretical expertise in information on the area of pharmacodermias and their insertion into practice, in collaboration with the Albert Sabin Children's Hospital (HIAS) and the Immunoallergology Outpatient Clinic becomes essential in the daily lives of professionals who work in this environment. **Objectives:** describe a flowchart of care for suspected pharmacodermias in inpatients and outpatients at the HIAS. **Methods:** The observational study had three phases from April to December 2023: 1) Meeting to prepare the questionnaire. 2) Distribution of the questionnaire via email to physicians after ethical approval. 3) Preparation of the service flow to optimize the service. **Results:** 144 emails were sent, with 38 responses received. With the data collected, a flowchart for implementation was created. **Conclusion:** The creation of the service flow can benefit patients and serve as a reference for other institutions, improving the quality of medical care.
Keywords: *Flowchart; Drug Allergy; Pediatric Hospital.*

RESUMO
Introdução: o fluxo de atendimento dentro das alergias medicamentosas tem sido um processo esclarecedor, quando a intenção é promover uma melhor qualidade no diagnóstico de pacientes pediátricos. O Centro de Estudo em Alergia Medicamentosa e Alimentar (CEAMA) já vem há algum tempo em parceria com a sua expertise teórica em informações sobre a área das farmacodermias e a inserção na prática, em colaboração com o Hospital Infantil Albert Sabin (HIAS) e o Ambulatório de Imunoalergologias se torna imprescindível no dia a dia dos profissionais que atuam nesse ambiente. **Objetivo:** descrever um fluxograma de atendimento de suspeita de farmacodermias em pacientes pediátricos internados e ambulatoriais do HIAS. **Métodos:** o estudo observacional teve três fases de abril a dezembro de 2023: 1) reunião para elaborar o questionário; 2) distribuição do questionário via e-mail aos médicos após aprovação ética; 3) elaboração do fluxo de atendimento para otimizar o serviço. **Resultados:** foram enviados 144 e-mails, com 38 respostas recebidas. Com os dados coletados, foi criado um fluxograma para a implementação. **Conclusão:** a criação do fluxo de atendimento pode beneficiar os pacientes e servir de referência para outras instituições, melhorando a qualidade da assistência médica.
Descritores: *Fluxograma; Alergia Medicamentosa; Hospital Pediátrico*.

RESUMEN
Introducción: El flujo de atención dentro de las alergias a medicamentos ha sido un proceso esclarecedor cuando la intención es promover una mejor calidad en el diagnóstico de los pacientes pediátricos. El Centro de Estudio de Medicamentos y Alergias Alimentarias (CEAMA) colabora desde hace algún tiempo con su experiencia teórica en información sobre el área de las farmacodermias y su inserción en la práctica, en colaboración con el Hospital Infantil Albert Sabin (HIAS) y el Ambulatorio de Inmunoalergología se vuelve imprescindible en el día a día de los profesionales que trabajan en este

1 Universidade Federal do Ceará. Fortaleza/CE - Brasil.
2 Universidade Federal do Ceará. Fortaleza/CE - Brasil.
3 Universidade Federal do Ceará. Fortaleza/CE - Brasil.
4 Hospital Infantil Albert Sabin. Fortaleza/CE - Brasil.
5 Universidade Federal do Ceará. Fortaleza/CE - Brasil.
6 Universidade Federal do Ceará. Fortaleza/CE - Brasil.
7 Secretaria de Saúde do Estado do Ceará. Fortaleza/CE - Brasil.

entorno. **Objetivos:** describir un diagrama de flujo de la atención a las sospechas de farmacodermia en pacientes hospitalizados y ambulatorios en el Hospital Infantil Albert Sabin por parte del grupo de investigación y mostrar cómo una iniciativa de este tipo representa efectivamente un servicio de gran beneficio para el paciente. **Métodos:** El estudio observacional tuvo tres fases de abril a diciembre de 2023: 1) Reunión para elaboración del cuestionario. 2) Distribución del cuestionario por correo electrónico a los médicos tras la aprobación ética. 3) Desarrollo del flujo de servicios para optimizar el servicio. **Resultados:** Se enviaron 144 correos electrónicos y se recibieron 38 respuestas. Con los datos recopilados se creó un diagrama de flujo para su implementación. **Conclusión:** La creación del flujo asistencial puede beneficiar a los pacientes y servir de referencia para otras instituciones, mejorando la calidad de la atención médica.
Descriptores: *Diagrama de flujo; Alergia a medicamentos; Hospital pediátrico.*

INTRODUCTION

Pharmacovigilance is currently known as the science that studies the adverse effects caused by medicines in certain groups to ensure greater patient safety. Currently, most hospitals in Brazil have the highest number of cases of Adverse Drug Reactions (ADRs), which are reported by health professionals[1].

Adverse Drug Reactions (ADRs) are unwanted effects that arise from the prescription of drugs in normal doses to patients. In a study carried out on the types of adverse reactions according to the System-Organ-Class (SOC) proposed by the World Health Organization's Terminology of Adverse Reactions (WHO-ART, 2016)[15], the SOC is found with the highest percentage in both serious reactions (23.7%) and non-serious reactions (36.1%), among the 11 most frequent reactions that were reported, are skin disorders, common in hypersensitivity reactions[2].

Adverse Drug Reactions represent a risk to the patient's health, so they must be investigated to restore their health and provide future preventive actions. At the time of analysis, it is important to study the prescription, the patient's history, and laboratory tests. That said, there are ways of differentiating the type of hypersensitivity reaction that is being presented, and one of them is the allergic/cutaneous testing service at Immunoallergology Centers. At HIAS, a sentinel hospital linked to the Sentinel Hospital Project created by the Ministry of Health together with the National Health Surveillance Agency (Anvisa) in 2001, 41 reports of suspected adverse drug reactions were received by the pharmacovigilance sector from January to November 24. These reports were obtained through active searches in the units and also spontaneously and were investigated and subsequently registered in the VIGIMED system, a system made available by Anvisa so that citizens, health professionals, drug registration holders, and study sponsors can report suspected adverse events related to drugs and vaccines. The main suspicions were skin rash and urticaria[3].

The research and its relevance are within the scope of the need for medical diagnosis and the existence of protocols or correct referrals for patients who enter the institution with a possible ADR associated with pharmacodermias. According to the outpatient structure, the hospital has the Immunoallergology Center in charge, to ensure better patient treatment in specific cases, but there were mistakes in the referrals of suspected allergic ADRs.

It can be seen that the quality of health services is a determining factor in ensuring risk reduction and control. Therefore, this study aimed to describe a flow diagram of care for suspected pharmacoderma in inpatients and outpatients at HIAS by

the research group and to show how this initiative effectively represents a service of great benefit to the patient. Thus, corroborating the elucidation of the medical diagnosis of these reactions.

METHODS

The study was carried out in 2023 at the immunoallergology outpatient clinic of the Albert Sabin Children's Hospital (HIAS) in Fortaleza, Ceará. This is a descriptive and retrospective cross-sectional observational study. It was exploratory in nature, using indirect methods (e-mail questionnaire).

Currently, HIAS has 310 beds, and its operations include clinical and surgical emergencies, an outpatient clinic with 31 specialties and a total of 144 medical professionals, medium and high-risk intensive care and neonatal units, a surgical center, clinical and imaging laboratories, as well as a center specializing in cancer treatment and diagnostic services. Some examples of its specialties and services are Allergology, Neurology, Cardiology, Neurosurgery, General Surgery, Nutrition, Plastic Surgery (Operation Smile - cleft lip), Ophthalmology, Neck Surgery, Orthopedics, Endocrinology, Gastroenterology, General Pediatrics, Pulmonology, Genetics, Psychology, Gynecology, Hematology, Rheumatology and Infectious Diseases.

The study included the participation of medical professionals who worked in the specialty outpatient clinic, and who may also be responsible for identifying and caring for patients suspected of hypersensitivity to drugs, particularly those with pharmacodermia, and who were under care at HIAS. This process was conducted in strict compliance with ethical standards and received approval from the Research Ethics Committee No. 6.295.914.

Initially, a situational diagnosis was carried out to understand the current flow of referrals of suspected drug allergies by the medical staff of the hospital's various inpatient units, identified as blocks A, B, C, and D. This was done by distributing an electronic form via Google Forms to the email addresses provided by the human resources department, with the authorization of the respective managers.

After collecting this information, a model instrument was drawn up for the appropriate referral of patients to the hospital's immunoallergology department. This tool, developed based on the responses obtained through the Google Forms form, will be integrated into the workflow of all the hospital's units as part of a pilot test of this study. After the successful conclusion of this experimental phase, the proposed tool will be submitted to the hospital's management for possible incorporation as a routine part of clinical procedures, with the aim of improving the care provided to patients with suspected allergic reactions to medicines.

RESULTS

During the second phase of the survey, a total of 144 emails were sent to the institution's doctors. Of these, 38 (26.38%) responded to a variety of specialty areas, including Pediatric Gastroenterology (10.53%), Pediatrics (28.95%), Pediatric Allergy and Immunology (13.16%), Pediatric Intensive Care (5.26%), Pediatric Endocrinology (2.63%), Genetics (2.63%), Pediatric Pulmonology (18.42%) and Pediatric

Rheumatology (18.42%). These doctors had different levels of experience, reflecting a variety of factors, including length of service, with some working at the hospital for two years, while others for up to 21 years.

Hypersensitivity reactions are divided into types I, II, III, and IV, and there are also Drug Hypersensitivity Reactions (DHRs), which are the most notable due to their severity and incidence, as well as being the most common cause of death due to anaphylaxis4. In addition, DHR can affect a variety of organs and systems, with the skin being the main target, where the most common manifestations include urticaria, maculopapular eruption, bullous eruption, and exfoliative dermatitis[5].

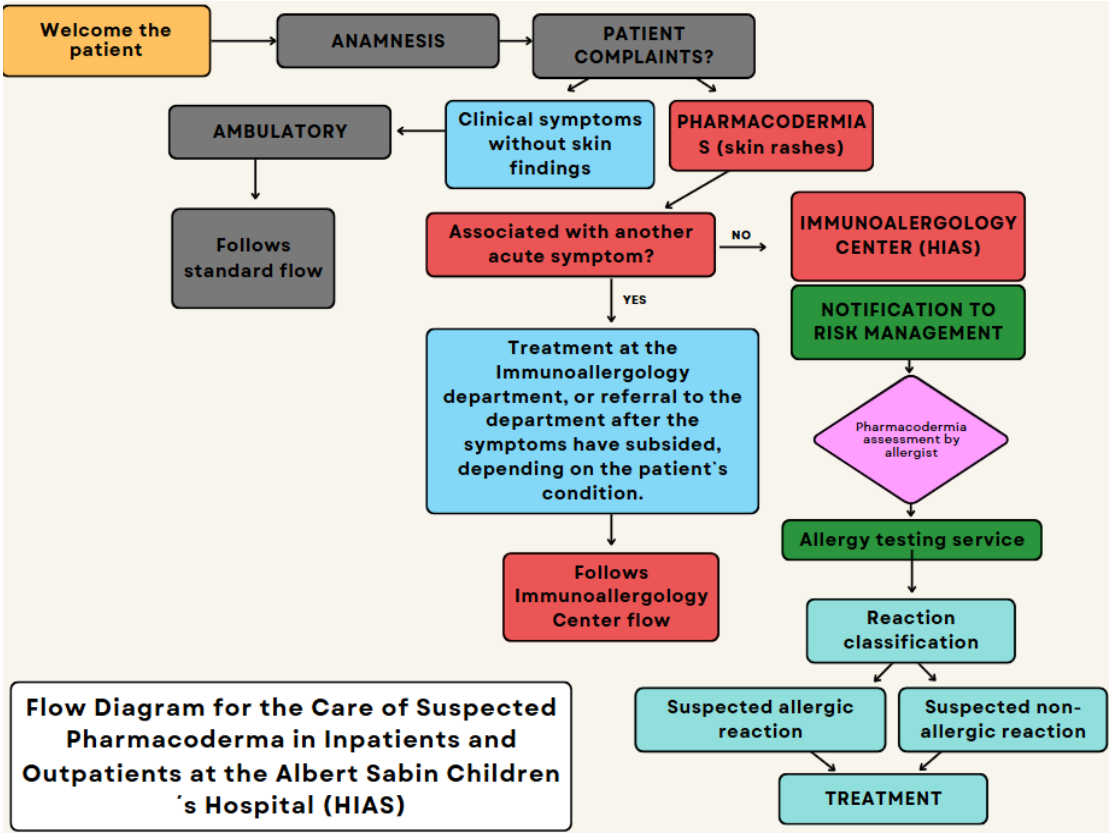
Of the responses to the form, 86.84% indicated that doctors had seen patients with ADR complaints in the last 12 months. In addition, 78.95% of doctors reported suspecting some form of DHR (allergy) during their consultation with these patients. This can be explained by the high incidence of adverse reactions, including type B ADRs, which are linked to individual susceptibility[6]. Furthermore, according to cross-sectional studies in children, there is a prevalence of up to 10% concerning DHR[7].

When faced with suspected DHR, doctors adopted different approaches: 63.16% recommended discontinuing the drug, 5.26% referred patients to the immunoallergology center and a further 7.89% notified risk management. These results provided a detailed overview of current clinical practices related to suspected DHR within the institution. Consequently, it can be seen that the procedure to be carried out is defined by the doctor himself, i.e. there is no protocol to be followed, which results in non-standardized care, which makes it difficult to organize vital information and obtain an accurate diagnosis, as observed in the study by Gray (2023), where the health professionals interviewed reported that there was no care protocol for this type of situation, which makes it difficult to differentiate hypersensitivity reactions from other adverse reactions.

The study in this article showed that the doctors interviewed treated patients with ADRs in the context of patient care. Although the majority recommended discontinuing the drug, there was a lack of uniformity in the care provided. Furthermore, when comparing these practices with the study by Warrington et al. (2018)[9] on medical conduct in cases of allergies, some marked differences were observed, especially in aspects related to referrals to specialists. In this study, based on interviews with doctors, it was observed that the number of referrals to immunoallergology centers is lower, which can be attributed to the lack of clear protocols in clinical practice. The lack of standardized reporting is also a problem, especially compared to more robust systems; for example in Canada, the country where the study by Warrington et al. (2018)[9] was carried out. This highlights the urgent need for clear protocols and effective reporting systems to improve patient safety.[12]

It is important to correctly diagnose DHR to take appropriate measures for patient safety and avoid unnecessary suspension of medication. Having said this, we move on to the third stage, the proposal of a flowchart for the care of suspected pharmacodermias in inpatients and outpatients at the Albert Sabin Children's Hospital (Figure 1), based on the situational diagnosis drawn up through the collection of responses to the situational questionnaire applied, to standardize the care of patients with suspected pharmacodermias.

Figure 1 - Proposed flow diagram for the care of suspected pharmacodermias in inpatients and outpatients at the Albert Sabin Children's Hospital.



Source: Prepared by the authors (2025).

Once this flow proposal had been drawn up, it was included in the final research report and sent, via the Brazil Platform, to the pediatric hospital in question, as a pilot test for the clinical units and institutionalized as a routine in the clinical processes by the hospital's management.

DISCUSSION

Identifying a medical condition is a challenging task that requires appropriate clinical knowledge so that the patient receives an assertive result. An incorrect diagnosis can lead to inappropriate procedures, resulting in harm to patients and additional costs. This complexity is also evident in the recording of ADRs, where the majority of reactions are non-allergic but are often mistakenly recorded as allergic reactions[10].

In addition to diagnosis, it is necessary to have an efficient system for reporting cases of adverse events presented, to generate a basis for study and communication aimed at health institutions, which will serve as a tool for preventing future risks and problems encountered in the routine. As a result, the lack or partiality of reporting makes it difficult to perceive the causes of adverse events, thus limiting intervention, promotion, and prevention aimed at patient safety[11].

A culture of safety is a job that requires focus and discipline, and a constructed flow facilitates this dynamic. A survey carried out in the municipality of Fortaleza (CE), in Emergency Care Units (ECUs) showed that professionals considered their perception

of patient safety to be good (55.6%), with the dimensions “expectations and actions of the management/supervision of the unit/services that favor safety”; “organizational learning/continuous improvement” and “teamwork in the unit/service” standing out positively, at over 75%. This result increasingly corroborates the importance of building a flow of care for pharmacodermias in a health institution[12].

The flow diagram was built to standardize medical conduct concerning cases of hypersensitivity reactions observed in the hospital in question. In addition, this tool helps to identify, classify, and refer cases of hypersensitivity, improving the tracking of adverse reactions in the health sector. Significant difficulties were identified during development, such as the lack of standardized clinical records, which made data consistency difficult, and differences in doctors' knowledge about the management of adverse reactions, reflecting the need for ongoing training. In addition, compliance with the questionnaire sent out was low, with only 38 responses out of 144 attempts, which limited the diversity of more comprehensive information on the clinical practices used.

The use of flow diagrams in healthcare is very important for integrating work between doctors and other healthcare professionals, standardizing procedures, and optimizing patient care. However, they must be developed based on research with robust evidence of their efficiency and ability to become useful in diverse clinical requirements. This can be considered a disadvantage, as it limits professional autonomy in the sense that it can restrict the right to choose in some situations. Even so, for this reason, they play a very important role in public health, especially where standard rules are lacking to avoid disparities in medical care and to improve patient safety.[13]

In addition, one of the aspects of Evidence-Based Practice (EBP) is clinical effectiveness, and this can be instrumentalized through processes reflected in the conduct of health professionals. EBP is understood as “an approach that associates the best scientific evidence with clinical experience and patient choice”[14].

FINAL CONSIDERATIONS

The flow diagram acts as a tool to standardize care, improving patient safety and the flow of information within the unit. Therefore, even if it is not approved, it is interesting that the idea is used to build another, more refined tool to improve care for these patients. Teamwork could considerably benefit the patients cared for in the pediatric institution, as well as serving as a reference for other institutions, representing an advance in the quality of health care offered.

The study has limitations, given that the number of medical professionals who responded was not enough to extrapolate the results in a more robust way within the hospital and outpatient setting. Medical professionals need to take advantage of and participate in the dynamics of research carried out in their area of work, as this leads to future potential for a better diagnosis, especially in a world as full of confusing factors as pharmacodermias, even if they are visible.

SUPPORT and/or ACKNOWLEDGMENT

This work was carried out with the support of the Universidade Federal do Ceará (UFC), the UFC Extension Office, and the Albert Sabin Children's Hospital, Fortaleza (CE), in 2023.

REFERENCES

1. Gomes ISN, Leonez LG, Araújo ALF. Use of pharmacovigilance as a tool for patient safety in a hospital environment. In: Proceedings of the 24th Symposium of End-of-Course Works of the ICESP University Center; 2022; Brasília, DF. p. 666–81.
2. Mota DM, Vigo A, Kuchenbecker RS. Adverse drug reactions in the Brazilian pharmacovigilance system, 2008 to 2013: a descriptive study. Cad Saude Publica. 2019;35(8):e00148818. doi:10.1590/0102-311X00148818.
3. Hospital Infantil Albert Sabin (BR). Data obtained from the VIGIMED - Anvisa system. Fortaleza (CE): Hospital Infantil Albert Sabin; 2024.
4. Castro IA, Vivan RHF, Carraro DC. Immunological events and main pharmacological groups causing immediate hypersensitivity reactions. Rev Terra Cult Cadernos Ens Res. 2022;38(Esp):159–70
5. Cuevas MSS, Oliveira KCN, Costa LA, Loeschke AGS. Drug hypersensitivity: a study on allergic reactions to β-lactams. Rev Eletr Acervo Saude. 2022;15(11):e11197. doi:10.25248/reas.e11197.2022.
6. Regateiro F, Faria E. Immunopathological mechanisms of drug hypersensitivity reactions. Rev Port Imunoalergol. 2016;24(2):63–78.
7. Viana JC, Abreu C, Gomes ER. Drug hypersensitivity in preschool children. Rev Pediatr Centro Hosp Porto - Nascer Crescer. 2016;25(1):15–21.
8. Gray MP, Dhavalikar N, Boyce RD, Kane-Gill SL. Qualitative analysis of healthcare provider perspectives to evaluate beta-lactam allergies. J Hosp Infect. 2023;141:198–208. doi:10.1016/j.jhin.2023.07.024.
9. Warrington R, Silviu-Dan F, Wong T. Drug allergy. Allergy Asthma Clin Immunol. 2018;14(Suppl 2):60. doi:10.1186/s13223-018-0289-y.
10. Ryan D, Flokstra-de Blok BMJ, Clark E, Gaudin C, Mamody M, Kocks J, et al. Allergic and hypersensitivity conditions in non-specialist care: flow diagrams to support clinical practice. Allergy. 2022;77(9):2618–33. doi:10.1111/all.15273.
11. Neta HFN, Andrade LL, Pereira VCLS, Trigueiro DRSG, Costa SMG, et al. Flowchart as a technology for reorganizing men's health care. Saude Colet. 2023;13(86):12743–60. doi:10.36489/saudecoletiva.2023v13i86p12743-12760.
12. Souza EA. Patient safety: reporting of adverse events in the federative units of Brazil between 2019 and 2022 [dissertation]. Brasília: Faculdade Laboro; 2022.
13. Paiva JSP, Rocha MKM, Feitosa AKN, Belo NP, Alves JSM, Freire CPL, Ibiapaba CMC. Patient safety: assessment in emergency care units. Cad ESP [Internet]. 2024 Sep 13 [cited 2024 Oct 16];18(1):e1863. Available from: https://cadernos.esp.ce.gov.br/index.php/cadernos/article/view/1863
14. Aguiar BRS. Importance of implementing the Manchester protocol in emergency care units: a literature review [Internet]. Uniceubbr, 2019. CORE; [cited 2025 Mar 24]. Available from: https://repositorio.uniceub.br/jspui/handle/prefix/13640. Accessed on: 2024 Dec 12.
15. Saunders H, Vehvilainen-Julkunen K. Nurses' evidence-based practice beliefs and the role of evidence-based practice mentors at university hospitals in Finland. Worldviews Evid Based Nurs [Internet]. 2017 [accessed on 2017 Dec 18];14(1):35–45. Available at: https://sigmapubs.onlinelibrary.wiley.com/doi/abs/10.1111/wvn.12189

16. WHO Collaborating Centre for International Drug Monitoring. The WHO Adverse Reaction Terminology – WHO-ART [Internet]. 2005 [accessed on 2016 Jun 7]. Available at: https://www.who-umc.org/vigibase/services/learn-more-about-who-art/