

# Drug Interactions in Pediatrics: Assessment and Clinical Impact – Review

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## Introduction

Pediatric patients constitute a population especially susceptible to a variety of drug treatments, which, in turn, may increase the likelihood of drug associated adverse events<sup>1,2,3</sup>. A clear example is the challenge faced in healthcare for these patients, especially in less developed regions, where traumas such as burns, for example, present a high risk of infection and complications. This requires multidisciplinary treatment involving several medications<sup>2</sup>, and the practice of off-label prescriptions is common in this population, due to the lack of data on certain drugs in pediatrics, which increases the risk of adverse reactions<sup>2,3,4</sup>.

The pediatric population differs significantly from adults in relation to the pharmacokinetics and pharmacodynamics of medications, which makes a specific and careful approach to the prescription and administration of medications in this group essential. It is important to highlight that the physiological characteristics of children, especially during the first decade of life, present significant variations that directly influence the functioning of the organs. Drug interactions (DIs) represent clinical events in which the effects of a drug are altered by the presence of another drug, food, drink or chemical agent. Such interactions can have potentially dangerous outcomes, leading to increased toxicity of a drug or reduced efficacy. Some IMs (Drug Interactions), however, can be beneficial, amplifying the effectiveness of drugs or correcting adverse reactions<sup>4</sup>. Therefore,

the objective of this study is to investigate the phenomenon of Drug Interactions (DI) in pediatric patients, aiming to better understand this scenario, which is still lacking in studies.

## Objectives and Methodology

This study rigorously reviewed twenty articles on drug interactions in pediatric patients. Out of these, five were selected for detailed analysis. The sources included hospital and outpatient records. The inclusion parameters for the selected articles are the number of prescriptions, occurrence and severity of interactions and types of medications involved.

The study aimed to comprehend Drug Interactions in children, an area still lacking in research. Given the unique susceptibility of these patients to drug treatments, the study seeks to contribute to safer practices in medication administration, ensuring the safety and effectiveness of pediatric treatment.

## Results

When reviewing several studies on DIs in pediatrics, they all corroborate the thesis that they are frequent and a problem, but they elucidate the need for more study on the topic. A study conducted by Feinstein in 2011<sup>1</sup> where out of 498,956 hospitalizations, 49% were associated with at least one Potential Drug Interference (PDDI), 5% with contraindicated PDDIs, 41% severe, 28% moderate and 11% minor.

In Table 1, we can see data from a

study carried out in a Pediatric Outpatient Clinic specializing in burn care (Rio de Janeiro - RJ). In this Study, 805 Prescriptions were analyzed, with 7,689 prescribed items (average of 9.5 medications per prescription), presenting contraindicated, important, moderate and secondary interactions<sup>2</sup>. All studies on the subject corroborate the same thesis.

**Table 1-** Assessment of drug interactions

<b>Number of prescriptions analyzed</b>	805
<b>Prescriptions with Interactions</b>	435 (54.04%)
<b>Average Interactions per Prescription</b>	4
<b>Total Interactions Identified</b>	1828
<b>Different Medications Involved</b>	43
<b>Different Medication Combinations</b>	84
<b>Severity of Interactions</b>	
Contraindicated	96 (5.25%)
Important	1077 (58.92%)
Moderate	452 (24.73%)
Secondary	203 (11.11%)

Source: Adapted from Baptista et al., 2020.

This reports the case of three interactions that led at least three patients to progress to more severe complications such as tachycardia (Dopamine vs Linezolid / Linezolid vs Norepinephrine), increased blood pressure, and absence seizure (Imipramine vs Linezolid)<sup>2</sup>.

In another study, carried out in a Pediatric Neurology Outpatient Clinic (Fortaleza – CE), 90 prescriptions with IMs were analyzed in 69

prescription pads (76.66%)<sup>5</sup>.

## Discussion

The analysis of DIs revealed a distribution of occurrence by severity categories, where important interactions represented the majority of cases<sup>1,2,3,4</sup> and contraindicated ones had a lower incidence on average <5.3, however extremely relevant given the potential to trigger serious adverse events in patients<sup>1,2</sup>. It was noticeable that the majority of cases involved polypharmacy, with more than three interactions per prescription<sup>1,2,3,4,5</sup>. Regarding the classes of medications most frequently involved in MI, opioids<sup>1,4</sup> and Anti-infective agents<sup>1,2</sup> are the ones that appear the most.

Patient safety when administering medications to pediatric patients is of paramount importance. Although medications represent a valuable tool for health promotion, their inappropriate use can result in additional costs and harmful adverse events<sup>3</sup>. Whether due to the medication itself or the interaction generated, which can often be confused by the aspect of polypharmacy. Furthermore, when thinking about the epidemiological profile, we analyzed in the articles a higher percentage of boys and children with comorbidities being affected by polypharmacy and consequently drug interactions<sup>1,2,5</sup>.

## Conclusion

It is concluded that investing in more research and promoting safe practices in administering medications to pediatric patients is essential to improve pediatric nursing practice and ensure the safety and effectiveness of treatment.

## References

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