DRUG–FOOD INTERACTION: IMPACTS AND CLINICAL CONSIDERATIONS

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Abstract

The interaction between medications and foods is a relevant and complex topic that may compromise treatment efficacy and patient safety. The present study is a review article whose general objective is to analyze the main interactions between medications and foods and their impacts on treatment efficacy. The specific objectives include classifying the most common types of interactions, identifying the medications most prone to interacting with foods, and suggesting strategies to minimize risks. The methodology consisted of a literature review, with the selection of scientific articles published between 2015 and 2024 in the PubMed, SciELO, LILACS, and Google Scholar databases. Descriptors such as “drug-nutrient interaction,” “drug interaction with foods,” “alcohol x medication,” and “drug interactions” were used, encompassing publications in Portuguese and English. The data were analyzed qualitatively. The results show that factors such as type of food, timing of intake, and drug characteristics can directly influence the absorption, metabolism, and excretion of medications. Medications such as antihypertensives, antibiotics, and supplements are more likely to undergo food interactions, which may reduce efficacy or cause adverse effects. It is concluded that knowledge about these interactions is essential for promoting the

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rational use of medicines, and that follow-up by health professionals and proper guidance for patients are indispensable.

Keywords: Medication, Interaction, Food, Treatment, Efficacy.

INTRODUCTION

Over time, medications have continuously evolved with the objective of promoting a constant increase in benefits for patients, which requires health professionals to remain continually updated through studies and practical experience in order to keep pace with such advances and ensure greater safety and efficacy in the treatment of patients with various therapeutic modalities (Horta; Coelho, 2022). Among the challenges faced, the interaction between medication and food stands out, as it may compromise therapeutic effects.

However, unfortunately, medications do not bring exclusively beneficial effects to health. Depending on their use and the way they are handled, they may cause adverse and harmful effects on health. This may occur from administration itself as well as from interaction with other components, compromising the therapeutic effect and, in some cases, significantly worsening the initial problem (Horta; Coelho, 2022).

When it comes to drug interaction, the interaction between medications and foods is a case that must be analyzed with caution, as it is complex and difficult to recognize. This situation should be investigated quickly in order to avoid compromising the patient's condition (Souza et al., 2017).

When a medication and a food are consumed simultaneously, several changes may occur in pharmacokinetics, affecting aspects such as absorption, metabolism, release, and elimination of the medication, which may significantly alter the expected effect of the drug and bring unexpected consequences to the patient (Koziolek et al., 2019).

Such nutrients may influence drug absorption by altering the pH of the intestinal contents, the rate of gastric emptying, intestinal peristaltic activity, and several other factors that influence the proper functioning of the medication (Dos Santos; De Lima; Silva, 2021).

The interaction between medications and foods is a topic of great relevance to public health, as it may affect treatment efficacy and patient safety. Many people are unaware of or do not understand the importance of proper medication administration and often use medicines inappropriately. In addition, there is a lack of knowledge about how certain foods may potentiate or reduce therapeutic effects.

The relevance of this study lies in the need to expand knowledge about these interactions, both for health professionals and for the general population. Understanding this information and its real importance may contribute to the rational use of medicines and reduce their harmful effects.

Therefore, this study is relevant because it expands knowledge on the subject, emphasizes that inappropriate use may lead to serious health problems and compromise treatment efficacy, and aims to guide the general population regarding the importance of adopting safer practices in medication use.

The administration of medications frequently occurs together with food intake, a practice that may generate critical interactions. Given this scenario, the problem guiding this research is: what is the impact of the main interactions between medications and foods on the efficacy of pharmacological treatments?

The present study has the general objective of analyzing the main interactions between medications and foods and their impacts on treatment efficacy. To this end, the following specific objectives are established: to classify the most common types of interactions in order to elucidate their mechanisms; to identify the medications most susceptible to such interactions, allowing targeted pharmacological surveillance; and to suggest strategies to minimize risks and improve therapeutic adherence among patients.

DEVELOPMENT

METHODOLOGY

The present study is a bibliographic review, a qualitative and descriptive investigation aimed at gathering and analyzing publications on the interaction between drugs and nutrients. For the preparation of this study, scientific articles published between 2015 and 2024 were selected. The sources consulted were databases such as PubMed, SciELO, LILACS, and Google Scholar, using the keywords “drug-nutrient interaction,” “drug interaction with foods,” “alcohol x medication,” and “drug interactions.”

Articles in Portuguese and English were selected in order to enhance understanding and coverage of the topic.

RESULTS AND DISCUSSION

A healthy diet is fundamental to ensuring a well-nourished body, functioning properly and preserving its structural integrity. In addition, it plays a crucial role in strengthening the immune system (Dutra et al., 2020). Furthermore, physical and mental condition improves considerably, which enhances learning, concentration, and disposition (Alves; Cunha, 2020).

According to ANVISA, a medication is a pharmaceutical product, produced or prepared technically, with a preventive, therapeutic, palliative, or diagnostic purpose (2020). It is essential to select the appropriate medication for each need and to monitor its use in order to avoid risks involving drug treatment (Silveira, 2021).

The inappropriate use of medications is one of the main factors leading to so-called irrational use. This practice, often characterized by self-medication without the necessary technical knowledge or the supervision of a qualified health professional, such as a pharmacist, significantly increases the likelihood of harmful interactions. Such interactions not only compromise treatment efficacy but may also precipitate serious adverse events, including cases of drug intoxication (Ferreira; Júnior, 2018).

The patient should be informed in advance by the healthcare team about the types of reactions that may occur when taking medication together with meals. This is justified by the fact that this combination may bring benefits to the patient, such as accelerating the desired therapeutic effect, or may cause harm, such as increasing the risk of toxicity (Almeida, 2018).

When a medication is ingested together with a food, changes are likely to occur in the pharmacodynamics and pharmacokinetics of the drug or nutrient, which may affect medication efficacy and its therapeutic effect, resulting in a drug-nutrient interaction (Almeida, 2018). This reduction in treatment efficacy occurs through decreased drug bioavailability and may lead to toxicity (Kose et al., 2021).

Drug-nutrient interaction occurs when there is a therapeutic alteration or when the patient's nutritional status is compromised. In addition, changes occur in the absorption, metabolism, distribution, and elimination of a drug or nutrient. Another important clinical effect of these interactions is linked to the modification of the physiological action of the drug or nutrient (Leal; Junior, 2018). This interaction directly affects the pharmacokinetics and pharmacodynamics of medications, reducing absorption and/or increasing the excretion of nutrients, which may lead to deficiencies with serious consequences such as weakness and dizziness (Souza et al., 2017).

Drugs administered orally share with foods and nutrients the same absorption process in the gastrointestinal tract, making this the primary site for the occurrence of interactions. The presence of food content in the stomach and intestines can significantly alter the dynamics of drug absorption, influencing critical variables such as gastric emptying time and the duration of the substance's stay in the digestive system. Such changes may result in either an increase or a reduction in the bioavailability of the drug, directly affecting the onset and intensity of its therapeutic action (Santos et al., 2022).

The presence of high-fat foods delays the gastric emptying process, which may result in an increased residence time of certain medications in the stomach. However, this change in absorption time generally does not cause negative effects for these drugs, provided that it does not interfere with the

amount absorbed. On the other hand, a reduction in the absorption rate of medications such as analgesics and antibiotics may cause significant clinical interference (Santos et al., 2022).

Among the various medications that most interact with foods, the following stand out: analgesics, anesthetics, antibiotics, medications for diabetes, antihypertensives (Captopril, Furosemide), supplements, and a variety of other drugs (Kose et al., 2021). In addition, vitamins and minerals are the nutrients most affected by this interaction. When interaction between drugs and nutrients occurs, it may result in malnutrition and pose risks to therapeutic treatment (Dantas, 2015).

The most common antihypertensives in pharmacotherapy present substantial drug-nutrient interaction, and since hypertension is a chronic disease, daily use of medication is required. Therefore, it is essential that the patient undergo strict monitoring so that no interaction occurs (Santos et al., 2020).

Prednisone may affect calcium transport, resulting in difficulty in absorption. In addition, it may increase urinary elimination of zinc and vitamin C, interfere with the renal process of vitamin D metabolism, and cause deficiencies (Silva et al., 2020).

Recommendations from health organizations warn about the consumption of amlodipine and grapefruit. Patients using amlodipine should avoid consuming large quantities of grapefruit or its juice, as grapefruit may increase amlodipine levels in the body, which may intensify side effects; however, no warning about this interaction was identified in other organizations (Stouras et al., 2022).

In addition to a variety of foods with high potential for drug interaction, alcohol stands out as one of the main interaction factors, modifying the entire bioavailability and pharmacokinetics. The population often ends up neglecting or failing to perceive its importance in this context (Neto, 2018).

The pharmacotherapeutic management of arterial hypertension requires special caution due to the high prevalence of interactions between antihypertensive agents and various nutrients. This susceptibility makes strict monitoring of the time interval between food intake and medication administration imperative. The adoption of this strategy is primarily aimed at optimizing drug absorption and minimizing side effects, thus ensuring treatment efficacy and patient safety (Freitas, 2022).

Thus, drug-nutrient interaction involves both physiological and pathophysiological aspects. It became evident that certain foods/nutrients may interfere with the absorption, bioavailability, and concentration of medications, which is a matter of concern, since it may cause treatment failure (Pereira, 2018).

Therefore, for the successful completion of pharmacological treatment without the occurrence of complications, it becomes essential to establish clear and continuous communication between the patient and the healthcare team. In this context, the pharmacist emerges as a fundamental professional, being responsible for precise and individualized guidance regarding potential interactions between drugs and nutrients. This specialized pharmacotherapeutic follow-up is a decisive strategy for the prevention of complications, ensuring greater safety and therapeutic efficacy (Barbosa; Medeiros, 2019).

CONCLUSION

This study succeeded in fulfilling its main objective of mapping the most important interactions between medications and foods. It was possible to list some medications that have significant interactions with foods, such as analgesics, anesthetics, and antibiotics. The analysis showed that the genesis of most related problems does not lie in an intrinsically negligent attitude on the part of patients, but rather in the lack of accessible information and clear professional guidance. In this way, the results obtained corroborate the premise that the knowledge gap constitutes a significant risk factor for health, underscoring the importance of educational strategies in the context of the safe use of medications.

It is important to mention that the research had its limitations. Since we basically depended on already published articles and reports, it was not possible to collect recent data on the proposed topic, as a large portion of the collected articles had been published more than 15 years ago. Another point is that the field of medications is constantly evolving, with frequent new discoveries, which makes it difficult to cover absolutely all possible interactions. Therefore, it would be interesting for new studies to conduct field research in health centers or with community groups in order to gather this information.

Finally, this study makes it even more evident how relevant this topic is and how crucial it is for health professionals to discuss it more with their patients and for it to be present in leaflets and warnings. To continue this work, I suggest that future studies create easy-to-understand materials, organize lectures in communities, and focus on populations that require more attention, such as older adults who take several medications. In this way, research moves off the page and becomes something that truly helps people use medications more safely.

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