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FOOD AND MEDICATION INTERACTIONS

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ABSTRACT

Specific nutrients in foods or beverages interact with pharmaceuticals taken at the same time, causing an unpleasant reaction or treatment failure. Food and medicine interactions have a significant impact on drug therapy compliance and success, yet the majority of these interactions go unrecognized and uninformed owing to a lack of understanding, sufficient history, follow-up, or awareness.

KEYWORDS: Food, Drug, Nutrients & Interaction

INTRODUCTION

Food and medication interactions occur when specific nutrients in foods or beverages interact with medications taken [1, 2] and can interrupt the pharmacokinetics, pharmacodynamics, bioavailability, and therapeutic effects of medications [2, 3].

Food and medicine interactions are inherently complex and variable, necessitating increased attention from the medical profession [3]. Food-drug interactions can cause treatment failure or predispose patients to a variety of potentially life-threatening side reactions [4, 5]. For example, tyramine interactions, which is a substrate present in aged and fermented foods like cheese, and monoamine oxidase inhibitors, may lead to a hypertensive crisis and myocardial infarction [6, 7, 8].

Food and medicine interactions are one of the major determinants of treatment and care quality. It's critical to pay attention to the medicine dosage and frequency and the nutrient elements and amounts when undergoing therapy. Because drugs can alter nutrient metabolism, the nutrients consumed, pharmaceutical pharmacokinetics, and pharmacodynamics can be affected [9]. This effect is due to the existence of a complex mixture of minerals, organic materials, proteins, and vitamins in foods, as well as the medication's complex formulation. Furthermore, in many circumstances, these impacts are unpredictable. As a result, the prevention of food-medication interactions is difficult.

The rate and amount of medicine absorption are frequently slowed by food. The beginning of effects is delayed when the rate of absorption is reduced, but the peak effects are not reduced. Reducing the extent of absorption, on the other hand, lowers the intensity of peak responses. A classic example of food decreasing drug absorption is the interaction between tetracycline antibiotics and calcium-containing meals. Tetracyclines generate an insoluble and non-absorbable compound with calcium. As a result, when tetracyclines are given with milk or calcium supplements, absorption is reduced, and antibacterial properties may be lost [5].

Some drugs' absorption can be slowed by high-fiber diets. Wheat bran rolled oats, and sunflower seeds, for example, inhibit the absorption of digoxin, a drug used to treat heart problems. Reduced absorption can lead to therapy failure since digoxin has a narrow therapeutic index.

The peak effects of drugs rise when the diet increases the degree of absorption. A high-calorie breakfast, for example, boosts saquinavir absorption (a drug for HIV infection). When using saquinavir without food, absorption may be insufficient to provide antiviral action.

Certain drugs' metabolism can be slowed by drinking grapefruit juice at the same time, raising their blood levels. The result can be rather impressive at times. Grapefruit juice co-administration increased blood levels of felodipine, a calcium channel blocker used to treat hypertension, in one of the investigations.

Grapefruit juice can cause lovastatin, cyclosporine, midazolam, and other medications to rise in blood levels. Other citrus liquids, such as orange juice, do not have this effect. Grapefruit juice raises drug levels by slowing down metabolism [(5)].

Certain beverages, such as soda pop or high-acid fruit or vegetable juices, might raise gastric acidity, causing some drugs to disintegrate before reaching the intestine. This combination will reduce the quantity of medication that can be absorbed into the body because most medications are absorbed in the intestines.

Interactions between medications and foods can occasionally exacerbate toxicity. Caffeine and theophylline, an asthma medication, can cause excessive CNS stimulation. Potassium-sparing diuretics (e.g., spironolactone) and salt replacements can cause dangerously high potassium levels in the body. Aluminum-containing antacids (Maalox) and citrus drinks (orange juice) can cause increased aluminum absorption.

Vitamin K-rich foods, such as spinach or broccoli, have been proven to create a pharmacodynamic antagonism with warfarin, resulting in a higher warfarin dose required. A bioflavonoid in grapefruit juice suppresses CYP3A, an enzyme involved in the metabolism of several medicines. When grapefruit is consumed with pharmaceuticals that are processed by CYP3A enzymes, the bioavailability of these drugs is increased by a factor of five. When grape juice is combined with felodipine, an antihypertensive medication processed by CYP3A enzymes, this happens [(11)].

Medication administration at the right time about meals is an important aspect of pharmacological therapy. Because food can dramatically impede the absorption of several drugs, these medications should be taken on an empty stomach. Other drugs, on the other hand, benefit from food absorption, thus they should be taken with meals [(5)].

When taken without food, several drugs cause stomach distress. These drugs should be taken with meals if the food does not alter their absorption. However, if food reduces their absorption, we are faced with a difficult decision: we can give them food to prevent gastrointestinal discomfort while simultaneously lowering absorption. Regrettably, the precise option is not evident. Selecting an alternative drug that does not irritate the stomach may be the best approach. Medication orders often fail to specify when a medication should be taken with meals. As a result, the medication may be administered incorrectly [(5)].

The clinical outcome of food and drug interactions is determined by a variety of factors, including the type of food consumed, medicine dosage, herbs, and the patient's age and health status [(2)].

Elderly patients, hospitalized patients, patients on medications with a narrow or low therapeutic index, as well as patients with chronic diseases requiring three or more medications (polypharmacy) including such diabetes, hypertension, depression, high blood cholesterol, or congested patients are all at greater risk for food as well as medication interactions and serious side effects [(12)]. As a result, health professionals must be aware of potential food and medicine interactions, as

well as be able to identify those who are at high risk, to utilize pharmaceuticals safely and effectively. Knowledge of medications and their use is one of the most important scientific issues for physicians, nurses, and pharmacists. Physicians who prescribe medications, pharmacists who fill these prescriptions, or nurses who administer them. All three groups may not be fully aware of the impact of a particular drug on an individual patient's nutritional status. Among them, the role of nurses is more important than others, because they are in a position that should complete the efforts of other groups [13, 14].

Following the principles of medication by nurses to protect patients' rights and prevent their complications is very important. So, following them could minimize the incidence of adverse events [15].

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