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Food-drug Interactions in Patients with Cardiovascular Diseases

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Abstract

Cardiovascular diseases are one of the most common diseases in the world. Anticoagulants and other drugs are prescribed as treatment for these diseases however, polypharmacy may increase the risk of drug-drug or food-drug interatrions and decrease patient compliance. Food-drug interatrions may put the patient at risk for serious adverse effects and reduce safety and efficacy of treatment. Food-drug interaction is a common problem that has occurred as a result of the concomitant use of multiple drugs with food. Food-drug interaction is the term used to describe how a food affects a medication in the body. Food can alter the effectiveness of medication, make unwanted side effects better or worse, or even bring on brand-new negative effects. Drugs may alter how the body processes food. Consumption of foods which contain vitamin K make anticoagulant therapy less effective. On the other hand, patients should be careful when consuming foods like: garlic, ginseng, ginger and ginkgo in order to avoid the undesirable effect of hemorrhage. Healthcare professionals should advice patients taking anticoagulants to be careful with the food they consume and clinicians should manage the time and dose variability of the medicine so a successful therapy can be achieved.

Keywords: Interaction, food, drugs, anticoagulants

Introduction

Many health issues can be treated and resolved with medicines. To guarantee their effectiveness and safety, they must be taken in a proper manner.

Medications should be extremely specific in their effects, have the same predictable effect for all patients, never be affected by concomitant food or other medications, exhibit linear potency, be totally non-toxic in any dosage and require only a single dose to affect a permanent cure. However, this ideal drug is still to be discovered. (Rabia Bushra, Nousheen Aslam, and Arshad Yar Khan,D. (2011). *Food-Drug Interactions*. https://pubmed.ncbi.nlm.nih.gov/22043389/)

Taking medicine is a normal routine for many people, but there are many aspects to think about to avoid unwanted interactions. Age, weight, sex, medical conditions, dose of medicine, other medications, vitamins and herbal supplements can affect any drug taken. (Jacqueline Boucher, n.d. *Common Food-Drug Interactions*. https://www.bvhealthsystem.org/expert-health-articles/common-food-drug-interactions)

Drug use can occasionally be significantly impacted by diet and lifestyle choices. A drug interaction occurs when another substance changes the activity of a drug, either by enhancing or weakening its effects or by creating a new effect that neither can produce on its own. Frequently consumed fruits, herbs, and alcohol can seriously harm the patient's health and cause the therapy to fail. Generally, most clinical food-drug interactions are caused by food-induced changes in the drug's bioavailability. The therapeutic impact of the majority of drugs is related with bioavailability, an important pharmacokinetic parameter.

Food intake exerts a complex influence on the bioavailability of drugs. It may interfere not only with tablet disintegration, drug dissolution and drug transit through the gastrointestinal tract, but may also affect the metabolic transformation of drugs in the gastrointestinal wall and in the liver. (A Melander, D. (1978). Influence of food on the bioavailability of drugs. https://pubmed.ncbi.nlm.nih.gov/81118/)

Food-drug interactions share the same pharmacokinetic and pharmacodynamic principles as drug- drug interactions. The effects of a drug's pharmacodynamic interaction may be antagonistic, synergistic, or additive.

Some interactions are more significant than others.

Grapefruit is the most well-known example, but also sevillian orange, pomelo and star fruit contain agents that inhibit cytochrome P450 3A4 (CYP3A4), which is the most important enzyme in drug metabolism. Patients should always be wary of mixing any medication with

alcohol. (B J Kirby & J D Unadkat, D. (2007). *Grapefruit juice, a glass full of drug interactions?* . https://pubmed.ncbi.nlm.nih.gov/17438537/)

Aim of study: Apprehending frequent Food-Drug Interactions and come to know various ways to prevent or minimise food-drug Interactions in order to achieve a successful treatment.

Methods

Data from 2015 through 2019 were obtained from the patient files archived to Statistic Department to Mother Teresa University Hospital . This retrospective study took under observation a total of 100 patients: 50 medical records selected from the Clinic of Cardiology, at Mother Teresa University Hospital Centre and 50 cases of cardiopathic patients who received treatment in community pharmacies.

Disease conditions were identified by International Classification of Disease (ICD-9) codes. In this study, ATC/DDD methodology known by the World Health Organization as a standard for drugs treatment, is used.

For outpatients, a brif survey was formulated to identify food-drug interactions. Medical records were studied for patients admitted to the Cardiology Clinic.

The selection criteria for patients were: patients who suffered from cardiovascular diseases (Coronary Artery Disease; Myocardial Infarction etc.) and patients who were treated with anticoagulant drugs.

From the medical records, data like: age, disease and comorbidities, past medical history, length of hospital stay, medication perscribed, diet etc. were gathered.

Patients who visited the pharmacy, anonymously, answered questions such as: “Have you been informed by the doctor about the diet you should follow while taking anticoagulants?” and “Have you personally inquired about the diet you should follow while using anticoagulants by searching medical articles on the Internet or medical books?”. These patients agreed to fill out the survay and deposited them in a box.

Results

The selected patients from the Clinic of Cardiology, at Mother Teresa University Hospital Centre suffered from cardiovascular diseases and other comorbidities from which, hypertension (41.3%) was the most common comorbidity followed by diabetes (36,1%), kidney disease (9.2%) and others (13.4%). (Fig.1)

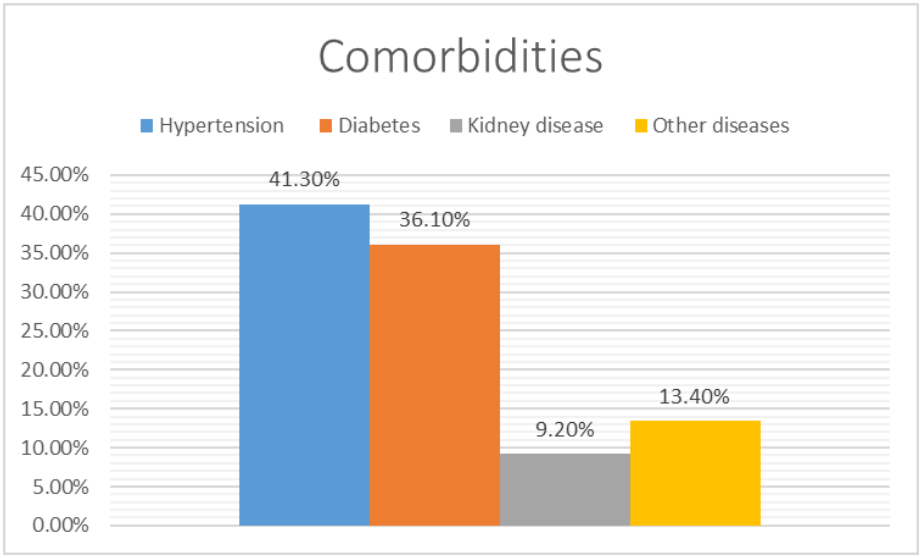

Fig.1. Most common comorbidities in patients with cardiovascular disease

All patients were treated with an anticoagulant drug. In the medical records there were no specific instructions about the unique diet that should be followed by these patients. There were prescribed only two tipe of diets (diet 1 and diet 2) without any other explonations.

There were no recommendations and/or advices documented in medical records regarding drug interactions with food, or adverse effects observed during therapy related to food. Additionaly, the exact time when the anticoagulant drugs should be taken and the exact time of meal consumption was not determined.

Cases of interventions in the dosage of medicine because of its' association with a certain food were very rare, nearly non-existent.

From the patients which completed the anonymous survey at community pharmacies, 29% aged between 50-60 years old and 39% aged older than 60 (in total 68%), were not aware of food-drug interactions. 21% aged between 50-60 years old and 11% aged older than 60 (in total 32%) were informed about food-drug interactions. (Fig.2)

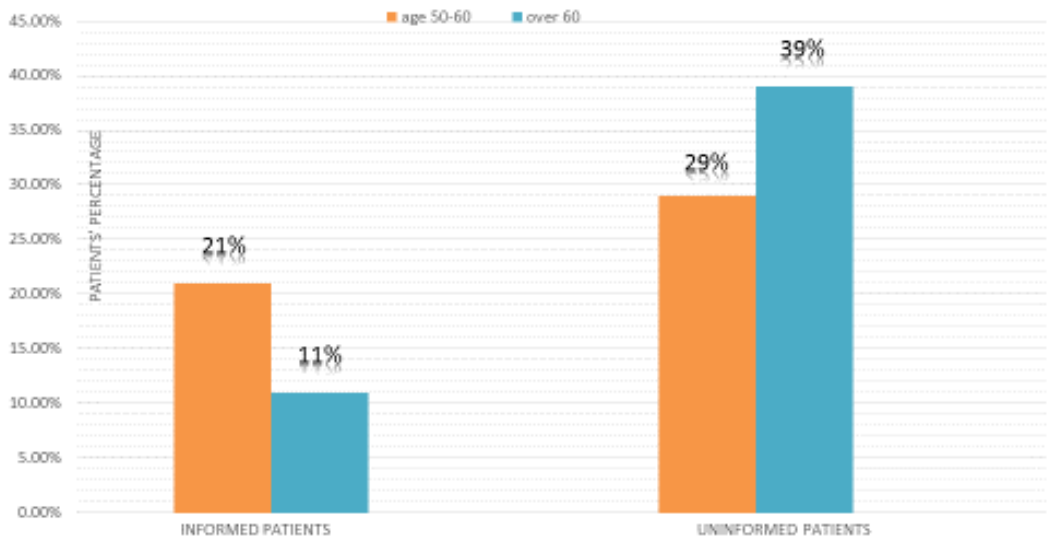

Fig.2 Percentage of patients who were informed/uninformed about food-drug interactions and their age.

We noticed that the age group 50-60 y old were more informed than the age group older than 60 y, because it is more easier for this age group to find information on the Internet, to travel abroad for examinations, to find and read medical literature etc.

From the patients that were informed, 39% were treated in clinics abroad and 61% were informed through the Internet, medical literature, etc. (Fig.3)

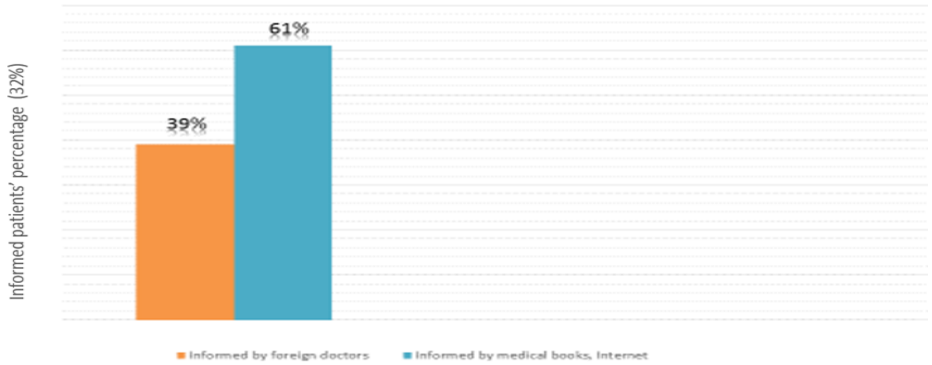

Fig.3. Graphical display of the information gathering methods used by patients about food-drug interactions.

Discussions

Vitamin K is one of the main ingredients of green vegetables such as: broccoli, peas, spinach, green salad, etc. therefore their consumption makes anticoagulant therapy less effective. Healthcare professionals should advice patients taking anticoagulants to maintain a consistent intake of vitamin K from foods and avoid consuming kale, spinach, and other leafy greens, cranberry juice etc. or clinicians should manage the time and dose variability of the medicine in order to achieve a successful therapy.

Patients should be cautious in consuming foods like: garlic; ginseng; ginger and Ginkgos in order to avoid the undesirable effect of hemorrhage.

Conclusions

Recognition of the problem is an important first step in developing strategies to minimize their occurrence. Raising awareness about food-drug interactions and the use of a personalised diet during the medication period is necessary. Advising post-hospital patients about their diet and the attentiveness they should have throughout their treatment is one of the main obligations of healthcare professionals. Continuous information and training of health workers (doctors, pharmacists, nurses) regarding possible food-drug interactions leads to optimization of therapy and improvement of patients' health.

A very small number of patients were taken into study, therefore a more extended study is needed.

More research has to be done on these potential interactions. Healthcare professionals should be aware of food-drug interactions and carefully inform and monitor any patient taking anticoagulants.

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