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Drug Interactions of Medicinal Plants with Chemical Antidiabetic Drugs

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ABSTRACT

Drug interactions can occur when a drug is used concurrently with other drugs, foods, drinks, or herbs. These interactions can alter the drug's effect on the body, making it either more or less effective than expected, or causing unexpected side effects. In this context, we examined the significant interactions between antidiabetic drugs and medicinal plants. Various herbs can affect blood glucose levels and may interact with antidiabetic medications. These include turmeric (*Curcuma longa*), anise (*Pimpinella anisum*), artichoke (*Cynara cardunculus* var. scolymus), garlic (*Allium sativum*), oregano (*Mentha pulegium*), fenugreek (*Trigonella foenum-graecum*), barberry (*Berberis vulgaris*), sour tea (*Hibiscus sabdariffa*), ginger (*Zingiber officinale*), saffron (*Crocus sativus*), chicory (*Cichorium intybus*), cloves (*Dianthus spp.*), dill (*Anethum graveolens*), *Aloe Vera*, red pepper (*Capsicum annuum*), and dandelion (*Taraxacum officinale*). These herbs have the potential to lower blood glucose levels. Therefore, combining these herbal remedies with antidiabetic drugs may lead to a drastic decrease in blood sugar levels, presenting a potential risk.

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Dear Editor,

Herbal medicines are plant extracts used with minimal or no industrial processing to ameliorate diseases in local medical and therapeutic activities (Farzaneh et al., 2015). Plants have been used as medicine by humans since ancient times (Barrett, 1999). Due to the side effects of some chemical drugs, many patients desire to be treated with herbal drugs (Malík and Tlustoš, 2022). The usual ineffectiveness of conventional medicine, adverse side effects of chemical drugs, widespread access to medicinal plants even in the form of food supplements, exaggeration about their effectiveness, and finally the reasonable cost compared to common drugs are the reasons for using medicinal plants instead of chemical drugs (Liang et al., 2020). Although many herbal medicines used traditionally are useful; it should be noted that the careless and uninformed use of these plants may cause risks to people's health due to the possibility of the presence of carcinogenic compounds and other toxic substances. Additionally, the use of these compounds with synthetic drugs may generate the conditions for drug interactions (Alkhamaiseh and Aljofan, 2020). Using such products without proper consideration may lead to delayed medical care, lack of focus on symptoms, and prolonged recovery (Gouws and Hamman, 2020).

Interference occurs when the effect of a drug is altered in the presence of another substance, such as herbal, food, drink, or chemical (Shahkib et al. 2020; Rao et al. 2021). This interaction can significantly increase the drug's toxicity or alter its effectiveness. Predicting

interactions related to medicinal plants is complex due to differences in individual characteristics of consumers, including age, sex, weight, race, underlying diseases, genetic factors, vital organ function, and nutritional status, as well as the great variety and unpredictable differences of medicinal plants in relation to each other (Izzo et al., 2001).

Glimepiride (Amaryl), glyburide (Diabeta, Glinase Prestab, Micronase), insulin, metformin (Glucophage), glibenclamide, pioglitazone (Actos), and rosiglitazone (Avandia) are some of the most important anti-diabetic drugs (Chaudhury et al. 2017; Ben Sahra et al. 2010). Turmeric (*Curcuma longa*), anise (*Pimpinella anisum*), artichoke (*Cynara cardunculus* var. scolymus), garlic (*Allium sativum*), oregano (*Mentha pulegium*), fenugreek (*Trigonella foenum-graecum*), barberry (*Berberis vulgaris*), sour tea (*Hibiscus sabdariffa*), ginger (*Zingiber officinale*), saffron (*Crocus sativus*), chicory (*Cichorium intybus*), cloves (*Dianthus spp.*), dill (*Anethum graveolens*), aloe vera (*Aloe vera*), red pepper (*Capsicum annuum*), and dandelion (*Taraxacum officinale*) reduce the blood glucose level, so the consumption of the mentioned medicinal plants together with antidiabetic drugs may cause excessive reduction of blood glucose, which is actual harmful (Nishiyama et al., 2005; Saikat et al., 2021; Ranade et al., 2017; Hajzadeh et al., 2011; Huang et al., 2019; Yaribeygi et al., 2019; Draz et al., 2010; Mohan et al., 2019; Oshaghi et al., 2015; Manjunath et al., 2016; Iddrisu et al., 2015; Kwon et al., 2007).

The potential for drug interactions between herbal and chemical medicines is a significant factor that makes the indiscriminate use of herbal medicines dangerous (Fleming et al., 2000; Corponter et al., 2001; Brent, 2002). While some interactions may not be very significant, others can be hazardous. The beneficial and sometimes unique effects of medicinal plants for treating certain diseases cannot be unnoticed, but the use of traditional forms of herbal medicines carries risks due to the aforementioned issues. Avoiding the use of herbal medicines is one way to prevent the many undesirable side effects resulting from their unscientific preparation and production. Additionally, the mechanism of action of many medicinal plants is not well understood, so the exact mechanism of plant-drug interaction remains unclear (Kuhn, 2002).

In this article, we assessed the significant interaction between antidiabetic medications and medicinal plants. Various herbs can have varying effects on blood glucose and may interact with antidiabetic drugs. Therefore, individuals using these medications must use medicinal plants cautiously and adhere to medical instructions to prevent adverse effects and undesired side effects. If a physician approves the use of herbal supplements alongside prescription chemical drugs, it is essential to ensure that the supplements are taken strictly in accordance with the provided instructions. Vigilance is necessary for symptoms arising from the interaction of these drugs with medicinal plants, including excessive reduction of blood glucose. Elderly individuals, who often take various pharmaceutical drugs and have debilitated liver and kidney function, are particularly at risk of antidiabetic drug interactions with medicinal herbs. Similarly, children are susceptible to side effects from drug interactions due to their lower body mass and insufficiently developed liver and kidney function.

Subsequently, it is significant to continuously search for therapeutic counsel and follow the doctor's informational and suggestions concerning the use of therapeutic plants and solutions.

Conflict of interest

There are no conflicts of interest.

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