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A study on current status of herbal utilization in Bulgaria. Part 2: Safety concerns

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ABSTRACT

Ethnopharmacological relevance: Herbs play an important role for Bulgarian people since centuries. Nowadays an increasing number of people are using over-the-counter natural health products. It is widely accepted that herbs are harmless and herbal remedies are often used without safety precaution. There is strong evidence that herbal chemical constituents could exert toxic effects, similarly to conventional drugs. Moreover, adverse reactions due to incorrect herbal utilization are often reported.
Aim of the study: The aim of this survey was to establish the knowledge of a representative random sample of Bulgarian people about herbal safety in order to find out: 1) the attitudes towards side effects of medicinal plants; 2) the knowledge on safety of the doses recommended in folk medicine; 3) the statement whether the herbs can replace conventional drugs; 4) the opinion about the necessity of control of herbal preparations; 5) the source of information of herbal utilization; 6) how specific demographic features of the participants related to their attitude towards safe herbal utilization.
Materials and methods: The present study is focused on safety of herbal utilization as a second part of a larger survey (Dragoeva et al., 2015). In order to determine the correlation between items questioned and demographic variables standardized Pearson correlation coefficient was calculated.
Results: The larger proportion of the respondents are not informed about the possible side effects of the herbs: 18.11% have given answer "I don't know" and 39.16% declare that herbs cannot cause side effects. About 86% of the informants declared that they trust in traditional knowledge of herbal application or that they have no information.

A greatest proportion of the informants (about 67%) were of the opinion that herbs can replace conventional drugs. The positive answer was given mainly by young respondents – pupils and students.

Informants belonging to age groups 41–50 and 51–60 years declared necessity of equal regulation of herbal products and conventional drugs. Some impact of the employment status on the answers was also established. This correlation is due partly to negative answer given by pupils. Another group of informants giving negative answer or answer "I can't decide" was unemployed.

A large proportion obtains information from friends (41.11%) and 36.91% of respondents acquire information from specialized books. Interestingly, only 21.98% have used mass media as a source of information.
Conclusions: This survey presents for the first time information regarding people knowledge about the safety of herbs in Bulgaria. The results reveal a necessary to ensure clear and comprehensible information about herbal safety for Bulgarian population. The public health role of mass media should be improved. The information should be especially adapted to pupils and unemployed.

1. Introduction

One of the main reasons for the renewed interest in phytotherapy is the assumption that anything natural is safe (Hussin, 2001). Herbal medicines can be used in the crude form or as refined pharmaceutical forms such as capsules, tablets, concentrated extracts, teas, etc. (Fakeye et al., 2009). An increasing number of people are using over-the-counter natural health products to maintain or improve their health. It is widely accepted that herbs are harmless and herbal remedies are often used without safety precaution. Many herbal products have not been thoroughly tested for their pharmacology and toxicology (Shaw et al., 2012). Scientific researches in herbal safety are limited, but

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there is strong evidence that herbal chemical constituents could exert toxic effects, similarly to conventional drugs. Hepatotoxicity (Abdualmjid and Sergi, 2013; Stickel et al., 2000), thrombocytopenia (Royer et al. 2010) and potential genotoxic effects (Fennell et al., 2004; Neelamkavil and Thoppil, 2014) due to prolonged use of some of the popular herbs are cause for alarm. Moreover, adverse reactions due to incorrect herbal utilization are often reported (Shaw et al., 2012).

Herbs play an important role for Bulgarian people since centuries (Nedelcheva, 2012). In modern society the unregulated sale of herbal preparations leads to possibility of incorrect utilization. As far as we know there is no study in Bulgaria focused on collection of information regarding people knowledge about the safety of herbs.

The aim of this survey was to establish the knowledge of a representative random sample of Bulgarian people about herbal safety in order to find out: 1) the attitudes towards side effects of medicinal plants; 2) the knowledge on safety of the doses recommended in folk medicine; 3) the statement whether the herbs can replace conventional drugs; 4) the opinion about the necessity of control of herbal preparations; 5) the source of information of herbal utilization; 6) how specific demographic features of the participants related to their attitude towards safe herbal utilization.

2. Materials and methods

The present study is focused on safety of herbal utilization as a second part of a larger survey (Dragoeva et al., 2015). The survey was carried out in different areas of Bulgaria during May-July 2013 by using the face-to-face interview technique. The researchers and Ethnobotany Club student members (Faculty of Natural Sciences, University of Shumen, Bulgaria) carried out the survey. The students were trained to conduct an ethnobotanical survey. The interviewed people were chosen randomly. The demographic features of the people who accepted to participate in the interview were determined. The information about the knowledge of respondents about herbal safety was obtained using the following questionary: "1) Do you think that herbs can cause side effects?; 2) Do you think that the recommended doses in folk medicine are safe? 3) Do you think that herbs can replace synthetic drugs? 4) Do you think that legislation to control herbal preparations must be equal with the conventional drugs? 5) What is the source of your information?". Descriptive statistic procedures like percentages and frequency distributions are used for analyzing the data.

3. Results and discussion

The demographic variables of the participants in the survey were reported and discussed in detail in the first part of this study (Dragoeva et al., 2015). The sample was representative of the Bulgarian population.

Data on the attitudes of informants towards herbal safety are given in Table 1. Influence of specific demographic features of the participants on the responses to the inquiry is presented in Table 2. In order to determine the correlation between items questioned and demographic variables standardized Pearson correlation coefficient was calculated.

The results revealed that the larger proportion of the respondents are not informed about the possible side effects of the herbs: 18.11% have given answer "I don't know" and 39.16% declare that herbs cannot cause side effects (Table 1). These statements clearly show that herbal products are perceived as safe. Even more striking are results in similar study in neighboring country (Turkey): only 3% of informants declared witness to any side effects due to utilization of a plant remedy (Akaydin et al., 2013). These data could be explained by limited information on herbal side effects. It should be noted that such information is mostly based on empirical data and usually acute toxicity accomplished by rapid onset of symptoms is reported (Shaw et al., 2012; Edwards and Aronson, 2000). Cumulative, chronic or delayed toxicity could be established only by scientific investigations.

Table 1
Responses of the respondents to the inquiry (n=475).

Questions	Responses	Number (%)
Do you think that herbs can cause side effects?	Yes	196 (41.26%)
	No	186 (39.16%)
	I don't know	86 (18.11%)
	No answer	7 (1.47%)
Do you think that the recommended doses in folk medicine are safe?	Yes	285 (60.00%)
	No	57 (12.00%)
	I don't know	124 (26.11%)
	No answer	9 (1.89%)
Do you think that herbs can replace conventional drugs?	Yes	163 (34.32%)
	No	139 (29.26%)
	To some extent	158 (33.26%)
	No answer	15 (3.16%)
Do you think that herbal medicinal products regulations must Be equal with the conventional drugs?	Yes	266 (56.00%)
	No	103 (21.68%)
	I don't know	88 (18.53%)
	No answer	18 (3.79%)
What is the source of your information?[a]	Mass media	131 (21.98%)
	Friends	245 (41.11%)
	Specialized books	220 (36.91%)

[a] The percent differs from 100% since more than one response was marked.

The attitudes of consumers towards herbal safety also depend on the particular herbs used by population. A recent survey reveals that the most frequently used plants in Bulgaria are *Thymus sp.* L., *Cotinus coggygria* Scop., *Hypericum perforatum* L., *Sempervivum* sp. div. and *Plantago major* L. (Kozuharova et al., 2013). Medicinal properties of these herbs are determined by numerous compounds, including flavonoids, iridoid glycosides (aucubin), naphtodianthrones (hypericins), phenolic acids, etc. The major constituents of essential oils of *Thymus sp., C.coggygria* and *H. perforatum* are phenols, sesquiterpenes and monoterpenes. It must be noticed that these plants are considered relatively safe.

The worldwide interest in herbal products has grown significantly. In recent years, medicinal plants are one of the leading areas of research (Soetan and Aiyelaagbe, 2009). Adverse effects related to numerous herbs have been reported (Bent, 2008; Kim et al., 2013; Teschke et al., 2014; Heng et al., 2013; Yang et al., 2014). Moreover, since herbs are often used as crude mixtures, different interactions between bioactive compounds could exist (Parle and Bansal, 2006). Additional problems are unexpected toxicity of herbal products due to quality issues, including use of poor quality herbal material, incorrect or misidentified herbs, incorrect processing methods, supply of adulterated or contaminated herbs or products (Bent, 2008; Shaw et al., 2012). Taking into account the above-mentioned aspects, it is necessary to pay attention to herbal safety knowledge because herbal products are usually self-prescribed.

Demographic variables have no impact on the statement about herbal side effects (Table 2). This data are of importance, since certain groups of the population are more susceptible to herbal