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**Herbal medicines for treatment of socially significant diseases in current Bulgarian society**

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**Abstract:** *Socially significant diseases are defined as widespread diseases causing great economic, social and demographic damage. Nowadays traditional health practices have gained increasing interest. The aim of this online survey was to establish the knowledge of a random sample of Bulgarian people about traditional medicines in order to find out: 1) the knowledge about the use of medicinal plants for some socially significant diseases; 2) the attitudes of respondents towards the medicinal plants safety; 3) the statement whether the herbs can replace conventional drugs. In present survey the most used medicinal plants reported was *Crataegus monogyna* Jacq., *Zingiber officinale* Roscoe, *Allium sativum* L., *Valeriana officinalis* L., *Sambucus nigra* L., *Cinnamomum verum* J. Presl and *Curcuma longa* L. Current scientific studies proved appropriate use reports of these plants. One of the reasons for the renewed interest in phytotherapy is the assumption that anything natural is safe, but there are data that herbal chemical constituents could exert toxic effects. The demographic features of our respondents revealed the importance of the level of education for the self-health care. So, more efforts should be focused on the spread of disease prevention information in low educated populations.*

**Keywords:** socially significant diseases, ethnobotany, herbal medicines

**Introduction**

Socially significant diseases (SSD) are defined as widespread diseases causing great economic, social and demographic damage [1]. SSD actually are diseases of modern lifestyle. Amongst them, cardiovascular diseases, cancer and diabetes lead to increasing mortality [2]. Constantly growing health problem are the

mental disorders. According to [3], the risk factors for them include society destabilization, the unhealthy lifestyle and uncertainty about the future. Notably, SSD reduction is possible only on the basis of increasing the responsibility of everyone for their health.

Plants have been used from centuries for treatment and prevention of physical and mental disorders [4]. Nowadays traditional health practices have *gained* increasing *interest*. To a great degree this is a consequence of the concept of *healthy lifestyle* [5]. One of the reasons for the renewed interest in phytotherapy is the assumption that anything natural is safe, but not all herbs have not been thoroughly tested for their pharmacology and toxicology [6, 7]. There are data that herbal chemical constituents could exert toxic effects. Hepatotoxicity [8, 9] and potential genotoxic effects [10, 11] due to prolonged use of some of the popular herbs are reported.

Different approaches have been used in order to collect data in modern ethnobotany. Nowadays online surveys represent a useful tool for data collection [12]. They ensure a large amount of data in a short time. Predominant population in Bulgaria is digitally connected, so online survey could be applied in scientific researches.

The aim of this online survey was to establish the knowledge of a random sample of Bulgarian people about *traditional medicines* in order to find out: 1) the knowledge about the use of medicinal plants for some socially significant diseases; 2) the attitudes of respondents towards the medicinal plants safety; 3) the statement whether the herbs can replace conventional drugs.

## Material and Methods

This research was conducted by collecting ethnobotanical information during interviews online. Ethnobotany Club bachelor student members (Faculty of Natural Sciences, University of Shumen, Bulgaria) carried out the survey. Questionnaires were prepared in order to document the most frequently used herbs for treatment of socially important diseases. Local plant names and particular use of the plants were recorded. Botanical species names were presented according to [13].

The demographic features of the people who accepted to participate in the survey were determined. Voluntary participation was documented in questionnaires. Then the participants were questioned to list the herbs and herbal products, which they considered could be used to treat some social important diseases – cardiovascular disorders, malignant neoplasms, diabetes, neuropsychiatric disorders. The questionnaire also included the statement of respondents about safety of herbs and possibility to replace synthetic drugs with natural remedies.

## Results and Discussion

### 1. Demographic analysis

The demographic features of the participants in the present online survey are presented in Table 1. Female informants predominated in our study. The attitude toward the medicinal plants utilization could be influenced also by the age, education and occupation of respondents [14]. The age of the informants ranged from 15 to 79 years old; more than half of the informants aged between 40 and 69. The majority of the respondents are well educated – only three of them had not finished high school.

**Table 1.** Demographic features of the respondents

| Demographic features |                   | Answers<br>(number) | % of<br>respondents |
|----------------------|-------------------|---------------------|---------------------|
| Gender               | female            | 177                 | 90.77%              |
|                      | male              | 18                  | 9.23%               |
| Age                  | between 15 and 19 | 3                   | 1.54%               |
|                      | between 20 and 29 | 21                  | 10.77%              |
|                      | between 30 and 39 | 33                  | 16.92%              |
|                      | between 40 and 49 | 45                  | 23.08%              |
|                      | between 50 and 59 | 33                  | 16.92%              |
|                      | between 60 and 69 | 46                  | 23.59%              |
|                      | between 70 and 79 | 14                  | 7.18%               |
| Education            | university        | 142                 | 72.82%              |
|                      | high school       | 49                  | 25.13%              |
|                      | basic school      | 3                   | 1.54%               |
|                      | no answer         | 1                   | 0.51%               |
| Occupation           | unemployed        | 13                  | 6.67%               |
|                      | pensioner         | 54                  | 27.69%              |
|                      | employed          | 116                 | 59.49%              |

|                    |            |                |
|--------------------|------------|----------------|
| university student | 9          | 4.62%          |
| pupil              | 3          | 1.54%          |
| <b>Total</b>       | <b>195</b> | <b>100.00%</b> |

Bulgarians have been used medicinal plants for centuries. In our previous online survey [15] we have noticed that the Internet population is demographically skewed relative to the general population, but this difference closing each year as more people gain internet access. Present online survey confirmed the statement of [16], that the online surveys are better accepted nowadays than in the near past years. The typical respondent in our study was a woman with a university degree who is working or retired. This observation reflects both more active presence of the women in online platforms and their greater responsibility and concern for health. The demographic features also revealed the importance of the level of education for the self-health care. So, more efforts should be focused on the spread of disease prevention information especially in low educated populations.

## 2. Respondent` statement about herbal utilization

Data collected in present survey is presented in the tables bellow. Herbs listed by more than 20 respondents are included in the tables 2 - 5.

**Table 2.** Answers to the question: Please, list the herbs that could be used for cardiovascular disorders

| Scientific name                 | Family       | Local name      | Answers<br>(number) | % of<br>respondents |
|---------------------------------|--------------|-----------------|---------------------|---------------------|
| <i>Crataegus monogyna</i> Jacq. | Rosaceae     | Glog            | 150                 | 76.92               |
| <i>Melissa officinalis</i> L.   | Lamiaceae    | Matochina       | 80                  | 41.03               |
| <i>Mentha</i> sp. div.          | Lamiaceae    | Menta           | 86                  | 44.10               |
| <i>Hypericum perforatum</i> L.  | Hypericaceae | Zhult kantarion | 39                  | 20.00               |
| <i>Rosa canina</i> L.           | Rosaceae     | Shipka          | 44                  | 22.56               |

**Table 3.** Answer to the question: Please, list the herbs that could be used for malignant neoplasms

| Scientific name                   | Family        | Local name   | Answers<br>(number) | % of<br>respondents |
|-----------------------------------|---------------|--------------|---------------------|---------------------|
| <i>Zingiber officinale</i> Roscoe | Zingiberaceae | Dzhindzhifil | 121                 | 62.05               |

|                                       |                |            |     |       |
|---------------------------------------|----------------|------------|-----|-------|
| <i>Camellia sinensis</i> (green tea)* | Theaceae       | Zelen chay | 59  | 30.26 |
| <i>Curcuma longa</i> L.               | Zingiberaceae  | Kurkuma    | 132 | 67.69 |
| <i>Calendula officinalis</i> L.       | Asteraceae     | Neven      | 51  | 26.15 |
| <i>Artemisia</i> sp.                  | Asteraceae     | Pelin      | 57  | 29.23 |
| <i>Allium sativum</i> L.              | Amaryllidaceae | Chesun     | 108 | 55.38 |

\*There are different types of teas manufactured from the *C. sinensis*, such as green tea, black tea, oolong tea and white tea [17].

**Table 4.** Answer to the question: Please, list the herbs that could be used for diabetes

| Scientific name                       | Family         | Local name   | Answers (number) | % of respondents |
|---------------------------------------|----------------|--------------|------------------|------------------|
| <i>Ocimum basilicum</i> L.            | Lamiaceae      | Bosilek      | 34               | 17.44            |
| <i>Taraxacum officinale</i> F.H.Wigg. | Asteraceae     | Gluharche    | 70               | 35.90            |
| <i>Zingiber officinale</i> Roscoe     | Asteraceae     | Dzhindzhifil | 68               | 34.87            |
| <i>Cinnamomum verum</i> J.Presl       | Lauraceae      | Kanela       | 139              | 71.28            |
| <i>Allium sativum</i> L.              | Amaryllidaceae | Chesun       | 61               | 31.28            |

**Table 5.** Answer to the question: Please, list the herbs that could be used for neuropsychiatric disorders

| Scientific name                     | Family        | Local name      | Answers (number) | % of respondents |
|-------------------------------------|---------------|-----------------|------------------|------------------|
| <i>Valeriana officinalis</i> L.     | Valerianaceae | Valeriana       | 191              | 97.95            |
| <i>Crataegus monogyna</i> Jacq.     | Rosaceae      | Glog            | 128              | 65.64            |
| <i>Hypericum perforatum</i> L.      | Hypericaceae  | Zhult kantarion | 51               | 26.15            |
| <i>Lavandula angustifolia</i> Mill. | Lamiaceae     | Lavandula       | 91               | 46.67            |
| <i>Matricaria chamomilla</i> L.     | Asteraceae    | Layka           | 73               | 37.44            |

Socially significant diseases are connected with the treatment costs and insist social, psychological and economic assistance of the patient [2]. According to the same authors, a survey in Bulgaria revealed high rates of arterial hypertension, diabetes and neoplasms among people in active age [3] also mentioned that cardiovascular, oncological diseases and diabetes are amongst the main reasons for mortality worldwide. The authors paid attention that the mental and the behavioral disorders occurrence is growing. The explanation is

the rapid changes in the modern life conditions, the urbanization, the structural changes in families and the aging population.

Traditional medicine gained an increasing interest nowadays. The appropriate use of medicinal plants could contribute for prevention and treatment of these health disorders. So, it is important to establish the knowledge of the population about herbal medicines. A matter of interest is the comparison between respondents` answers and data in scientific literature. There are a lot of studies about health properties of herbs for different diseases. The most cited herbs in present online study are listed below (more than 100 reports). Three medicinal plants have been reported to be used for two purposes – *Crataegus monogyna* (278 reports), *Zingiber officinale* (189 reports) and *Allium sativum* (169 reports). The other most frequently mentioned plants were *Valeriana officinalis* (191 reports), *Sambucus nigra* (144 reports), *Cinnamomum verum* (139 reports) and *Curcuma longa* (132 reports).

In present survey hawthorn (*Crataegus monogyna*) was reported to be used for cardiovascular and neuropsychiatric disorders. According to [18] numerous studies established a wide range of cardiovascular pharmacological properties of this herb [19] summarized data that hawthorn was recognized in European pharmacopoeias for treating heart disease and for its hypotensive action. It`s well known that hypertension affects a great proportion of world population, leading to various diseases. [20] described that multi-therapeutic role of *Crataegus monogyna* is based on numerous valuable secondary metabolites, such as flavonoids, vitamin C, glycoside, anthocyanin, saponin, tannin and antioxidants. These chemical compounds ensure positive effects on anxiety and depression and protection against neurological disorders [20].

Worldwide used for ancient times ginger (*Zingiber officinale*) and garlic (*Allium sativum*) were reported in this study to be useful in the case of malignant neoplasms and diabetes. A lot of scientific researches described that *Zingiber officinale* possess a lot of healing properties, including diabetes and various forms of cancer [21]. The biological activity of ginger was mainly due to its active phytochemicals 6-gingerol, 6-shogaol and zingerone [22]. Similarly to ginger, current studies support a wide range of therapeutic properties of *Allium sativum*. Garlic contains valuable sulfur-containing compounds [23]. Bioactive compounds in garlic have numerous effects, including anti-tumor properties against diverse cancers and regulation of blood glucose concentration [24].

Three medicinal plants were reported by our respondents in specific health conditions – *Curcuma longa* L., *Cinnamomum verum* and *Valeriana officinalis*.

A popular medicinal plant turmeric (*Curcuma longa*) was mentioned in present survey as an anticancer agent. Nowadays cancer represents an important health problem. Studies revealed that turmeric was effective in apoptosis inducement, reduces metastatic potential and inhibits tumor proliferation [25].

Cinnamon (*Cinnamomum verum*) healing properties also has been explored for centuries. Our respondents reported its utilization in the case of diabetes. Current studies proved that cinnamon is effective in management of diabetes by enhancing insulin sensitivity and insulin secretion, regulating glucose metabolism and protection of islet cells [26].

Physic and psychic health are intrinsigly connected. Valerian (*Valeriana officinalis*) was frequently reported in present study in the case of neuropsychiatric disorders. This plant was very popular in traditional medicine for its sedative properties. Moreover, scientific researches established neuroprotective influence of valerian and opportunity to prevent neuronal degeneration in aging or neurodegenerative disorders [27].

### 3. Statement of respondents about medicinal plants` safety and their importance as remedies

The present survey indicates that medicinal plants are popular in contemporary Bulgarian society and can be used in the case of SSD. This is of great importance because these diseases can be prevented via healthy lifestyle. On the other hand, application of natural products is connected with the knowledge about their safety (Table 6). The larger proportion of the respondents are not informed about the possible side effects of the herbs: 7.18% have given answer "I don't know" and 45.64% declare that herbs cannot cause side effects.

**Table 6.** Answer to the question: Do you think herbs have side effects?

| Respondents`<br>answers | Answers<br>(number) | % of<br>respondents |
|-------------------------|---------------------|---------------------|
| Yes                     | 91                  | 46.67%              |
| No                      | 89                  | 45.64%              |
| I don`t know            | 14                  | 7.18%               |
| no answer               | 1                   | 0.51%               |

In scientific literature usually the safety of bioactive compounds is largely discussed. As pointed by [6] herbs themselves can be toxic or toxicity could occur in combination with other medicinal drugs. So, these results of present survey revealed a necessity of providing accessible information about possible side effects of herbal medicines in mass media and social network in Bulgaria.

The answer to the question whether herbs can be used instead of conventional drugs are summarized in Table 7. The greatest proportion of the informants (about 64%) were on the opinion that herbs can replace synthetic drugs. 9.74% of informants were on the opposite opinion.

**Table 7.** Answer to the question: Do you think herbs can replace synthetic drugs?

| Respondents`<br>answers | Answers<br>(number) | % of<br>respondents |
|-------------------------|---------------------|---------------------|
| Yes                     | 125                 | 64.10%              |
| No                      | 58                  | 29.74%              |
| I don`t know            | 12                  | 6.15%               |
| Grand Total             | 195                 | 100.00%             |

The statement that herbs could replace conventional drugs could be a consequence of the growing interested in traditional medicine as a part of healthy lifestyle [5]. However, still herbal products should be used as a supplementary healthcare. Results from this question payed attention of providing information about appropriate use of herbs.

## Conclusions

The present survey indicates that medicinal plants are popular in contemporary Bulgarian society and can be used in the case of socially significant diseases. This is of great importance because these diseases can be prevented via healthy lifestyle. On the other hand, the results of present survey revealed a necessity of providing accessible information about possible side effects of herbal medicines in mass media and social network in Bulgaria. The statement that herbs could replace conventional drugs payed attention of providing information about appropriate use of herbs.

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