

**CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE**

**Faculty of Tropical AgriSciences**



**Consumer's attitudes to herbal products in Ukraine**

MASTER'S THESIS

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## **Declaration**

I hereby declare that I have done this thesis entitled “**Consumer's attitudes to herbal products in Ukraine**” independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague date

.....  
name of the student

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## **Abstract**

Herbal products (HPs) were historically the first form of medicine at our planet, which people started to use with healing purpose thousands years ago. Since that time, modern medicine has achieved major success in prevention and treatment of different diseases. Nevertheless, due to numerous reasons we analyze in this thesis, people continue actively use HPs and their consumption becomes more and more popular worldwide from year to year.

The main objective of the thesis was determine the attitudes of Ukrainian adult consumers towards herbal products and find out which ones are most commonly used and for what reasons.

Willingness to use herbal products was examined according to socio-economic data (such as gender, age, occupation, education, marital status, residential area, family income) to analyze the dependencies.

Primary data were collected by author through questionnaire survey, which was distributed in person in 20 towns and districts of Khmel'nitska oblast in Ukraine, which has been chosen as a study area. The respondents were chosen via convenience non-random sampling method. The data were collected from 331 respondents. A Binary logistic regression method was used to determine the association between consumer preferences and selected socioeconomic characteristics. A descriptive statistics was used to summarize the main features of the sample.

Based on the analysis, it has been found high level of familiarity with herbal products and high level of their usage by the respondents. The most popular herbal products were *Peppermint*, *Lemon balm*, *Pot marigold*, *Camomile* and *St. John's wort*. The main reported reasons for using herbal products were gastrointestinal, immune, stress, skin, hair and nails problems as well as respiratory system diseases. In general, the respondents consider herbal products as efficient (54.7%), cheap (94.8%) and safe (81.8%) medications, but agree that their healing effect could be higher in case of combination with conventional drugs (81.6%).

**Keywords:** Consumers' preferences, Food consumption, Health, Herbs, Nutrition.

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## **List of the Abbreviations Used in the Thesis**

FAO        Food and Agriculture Organization of the United Nations

HPs        Herbal Products

USD        United States Dollar

WHO       World Health Organization

## **1. Introduction**

The worldwide rapid increase in herbal products usage became the mainstream of last few decades. In many low-income countries, it could be explained by long time traditions and deep indigenous knowledge about herbal products as well as fertility boom and urgent need to provide bigger amount of medications to bigger number of consumers, including those who do not have access to modern health care system.

The situation in high-income countries is a bit different. Their citizens have access to the modern medicine. But because of bad experience and dissatisfaction with it together with strong believes, that natural products neither have any side effects, nor could cause serious health problems and aggressive mass-media promotion of the advantages of herbal products, start to use them actively even without any prescription from doctors' side.

Global increasing of popularity of herbal products led to unexpected increase of its market, which is the fastest growing in the world nowadays and it is supposed to continue its rising intensively at least during next years, until 2050.

Undoubtedly, herbal products have an outstanding potential in treatment and prevention of different diseases. However, this potential is still hidden. During a quite long history of human civilization it has been discovered just a little about it, due to the fact that just a very small percentage of herbal products has been studied in terms of utilization in medicine.

First antibiotic, which saved millions of lives, was derivated from herbal products and they are still actively used for producing many other medications. There is no rational sense even to debate that herbal products could be useful for creation new drugs in future as well. They already proved their cost-effectiveness in treatment practices. Nevertheless, it does not seem reasonable to refuse conventional medicine and try to replace it by herbal medicine. Just the

other way around: truly win-win strategy is to combine ancient indigenous practices with advanced modern scientific techniques and knowledge.

One of the first step in this regard is studying people' knowledge, traditions, attitudes, preferences of herbal products from all over the world. Case of Ukraine in these circumstances is very interesting due to rich flora of the country, ancient herbal products traditions of its inhabitants and relatively low number of the literature that covers the topic. Therefore, this fact determines the relevance of this Master thesis, which is supposed to fill in the scientific gap regarding herbal products use in Ukraine.

The main focus is oriented to discover why, how often and in which forms do Ukrainians use herbal products, what are the main sources of information about these products, where do people get them from and analyze the dependencies between Ukrainians willingness to use herbal products and different socioeconomic factors.

## **2. Literature Review**

### **2.1. Herbal Products: Production and Distribution**

According to the scientists, a herb is any non-woody, seed-bearing plant which dies down to the ground after flowering, whose leaves, seeds, flowers, or other parts can be used to improve health, combat disease, for food and its flavoring, and improve environmental quality with scents (Glynn & Bhikha 2018). Herbal products, in turn, usually are defined as raw or processed herb(s), which is (are) used to prevent illness (es) or improve health (Jibril et al. 2019). Numerous researches approved, that humans have used plants for healthcare reasons since prehistoric times (Yuan et al. 2016; Shi et al. 2010; Fabricant & Farnsworth 2001).

Herbal products formed the basis of Chinese, Indian (Ayurveda, Siddha), Japan (Kampo), Korean, Perso-Arabic (Unani – nowadays accepted by India as well) traditional medical systems and played vital healing role in medicines of other countries from all over the world. Furthermore, in some countries they are still a backbone of the whole medical system. Thus, for example, in China traditional medicines account for up to 50% of the total medicinal consumption (Nirmal et al. 2014).

At the same time, if for the primary healthcare needs herbal products are used by 40% of Chinese urban patients, in rural areas over 90% of population consumes them (Xiao 1991).

Generally, according to the WHO data, between 70% and 95% of citizens in a majority of low-income countries, especially those in Asia, Africa, Latin America and the Middle East, use herbal medicines, for the management of health and as primary health care to address their health-care needs and concerns (Robinson & Zhang 2011).

At the same time, some researchers (especially active advocates of Western medicine) emphasize on side effects of herbal products usage (particularly non-prescribed) and argue,

therefore, that (1) this kind of medicines either could be dangerous (Colato 2012; Ahmed et al. 2018; Karjodkar & Khanna 2004; Ekor 2013; Pirmohamed 2004), or (2) consider herbal products as very unreliable source of medication (Parasuraman et al. 2014).

Indeed, the general point of view that herbal products are completely safe and do not have side effects is a big misconception. Because in reality herbal products could cause different adverse reactions and even lead to death of its consumer. Such cases have been analyzed in the literature repeatedly (Vanherweghem & Degaute 1998; Cosyns et al. 1999; Ernst 2002).

The problem of adverse effects of non-prescribed herbal products is closely linked with (1) issue of law regulation of herbal products usage and as a result with (2) health insurance coverages. Due to the fact, that “herbal medicine in many countries took a “back seat” and was perceived as the poor cousin to conventional, or Western medicine” (Glynn & Bhikha 2018) herbal products are legislatively recognized as dietary supplements rather than medications. It actually means, that herbal products are still not recognized by official health care and, therefore:

- patients who are not satisfied with results of conventional medicine’s treatment, start to do self-medication with herbal products, which, of course, leads to adverse effects;
- many insurance companies do not cover visits to the traditional medical doctors and herbal medicine usage, or offer limited coverage (Calabro 2009).

Regarding doubts about reliability of herbal products as source of medication, it should be said, that, the era of “modern” drugs began just 200 years ago, at the beginning of the 19<sup>th</sup> century, when in 1805 the first pharmacologically-active compound morphine was isolated by German pharmacist Friedrich Sertürner (Yuan et al. 2016). Nevertheless, interestingly, morphine was derived from plant – opium. According to official data, approximately 54% of all anticancer and 64% of all antihypertensive drugs used during last decades were derived from herbs as well (Newman 2003; Li-Weber 2009).

At the same time other researches showed, that around 80% of 122 compounds used in healing other illnesses originated from 94 plant species (Fabricant & Farnsworth 2001).

Nevertheless, the development of advanced techniques for producing chemistry-based drugs, led to a significant reduction in the importance of natural products and even caused concerns, that the use of some natural products for medicinal purposes might be completely banned (Yuan et al. 2016). However, for instance, analyses of the evolution of antibiotic resistance showed, that purely synthetic drug medication strategy are highly limited, because “bacteria are continuously adapted their defense mechanisms, and any new synthetic antibacterial compounds will be sooner or later ineffective” (Ionescu 2018).

Literature analysis also showed that even the process of derivation of active components from herbs in laboratory conditions could lead to some losses in effectiveness of such medications. Thus, due to some researches raw herbal products themselves are more effective than the chemical derivatives, because they contain unique combinations of chemical components (Li 2002).

At the same time, just a very small part from the existing approximately 350,000 higher plants species have been scientifically researched for bioactivities and pharmaceutical effects (Heywood 2011).

These facts confirm once more time, that the role of herbal products in medicine should not be underestimated and open new horizons for further scientific studies.

Beneficial to the health care systems of all countries, in this context, seems combining of experience and knowledge of traditional medicine and modern medicine with its high-throughput synthesis methods and scientists' efforts.

Therefore, the WHO, which almost 20 years ago made investigation of the pharmacopoeias of developed and developing nations and the associated world scientific literature a part of the its Traditional Medicine Program (Yuan et al. 2016) declared so called “Integrative medicine” as priority for further researches and mentioned in its last year global report, that

one of the biggest issue in this regard is lack of data about herbal products usage in different countries (Robinson & Zhang 2011).

Integrative medicine in these terms is defined as “practising medicine in a way that selectively incorporates elements of complementary and alternative medicine into comprehensive treatment plans alongside solidly orthodox methods of diagnosis and treatment” (Rees, Weil 2001).

The commercial value of herbal medicines on the international market is high and increasing greatly (WHO 2005). According to latest data, between three markets with largest consumption’s share of herbal products are American, European and Asia-Pacific (Market research future 2019). The fastest growing market is the US (Nirmal et al. 2013). Just for 8 years, between 1990 and 1997, herbal usage in the US had been increased by 380% and annual retail sale of herbal products had been increased from US\$ 200 million in 1988 to US\$ 5.1 billion in 1997 (Nirmal et al. 2013). In 2009 herbal products sale in the US reached US\$ 14 billion (Bhowmik et al., 2009).

Nevertheless, the US holds just third place in the world by market share of herbal products consumption. The largest market is Europe, which contributes to 40.8% of the share (Cision 2018) and together with Asia-Pacific region occupies 72.36% of the global consumption volume in total (Faisal 2019).

## 2.2. Characteristics of Herbal Products

Based on publications (Boltarovych 1994; Karhut 2001; Mamchur 1993; Nosal' 1959), advices of local specialists and hypothetical assumption that inhabitants of low-income countries consume mainly local herbs, the list of herbs used in the study has been selected (Table 1). Besides that, respondents had also an opportunity to write their own herb species and medical reason why they use it.

**Table 1. The list of selected HPs and their characteristics**

<b>English name</b>	<b>Latin name</b>	<b>Ukrainian name</b>	<b>Spreading</b>	<b>Main medical reasons of consumption in Ukraine</b>	<b>Forms of consumption</b>
Peppermint	<i>Mentha piperita L.</i> ×	М'ята перцева	Whole territory of Ukraine	Pain sensations; illnesses of gastrointestinal tract (activity of bowels, digestion, liver, gall bladder); different inflammatory processes in the body; muscle spasms etc.	Herbal tea; tincture; decoction; herbal infusion; essential oil.
Lemon balm	<i>Melissa officinalis L.</i>	Меліса лікарська	Whole territory of Ukraine	Nervous system disorders; pain sensations; cardiovascular system problems; illnesses of gastrointestinal tract; bronchopulmonary diseases; insomnia; mental activity disorders; gynecological disorders.	Herbal tea; decoction; herbal infusion; essential oil.
Pot marigold	<i>Calendula officinalis L.</i>	Календула лікарська	Whole territory of Ukraine	Illnesses of gastrointestinal tract (gallbladder, ulcer, gastritis, colitis, liver disorders); laceration, septic wounds, burns; insomnia; angina, gum disease, eyes inflammation; inflammatory processes caused by staphylococci and streptococcus viruses; nervous system disorders; hypertension; fainting and vomiting during pregnancy;	Tincture; decoction; ointment.



				hepatitis; urinary bladder diseases; arthrosis, rickets; bronchopulmonary diseases.	
Ribwort plantain	<i>Plantago major L.</i>	Подорожник великий	Whole territory of Ukraine	illnesses of gastrointestinal tract (gastric secretions, gastritis, ulcer, colitis); normalizing the cholesterol level; normalizing the blood pressure; bronchopulmonary diseases; inflammatory processes caused by different bacteria.	crude herb; decoction.
Camomile	<i>Matricaria chamomilla L.</i>	Ромашка аптечна	Whole territory of Ukraine	Illnesses of gastrointestinal tract (gastric secretions, gastritis, ulcer, colitis, gallbladder, liver disorders, diarrhea, flatulence); gynecological disorders; urinary tract inflammation; vomiting during pregnancy; dermatological diseases; angina, pharyngitis, gum disease, eyes inflammation (conjunctivitis); boils; rheumatism;	Herbal tea; decoction; herbal infusion.
Common nettle	<i>Urtica dioica L.</i>	Кропива двodomна	Whole territory of Ukraine	Internal hemorrhaging (intestinal tract and uterus); illnesses of gastrointestinal tract (gastritis, ulcer); vitamin deficiency; different inflammatory processes in the body; anaemia; atherosclerosis; cardiovascular system problems (mainly vasoconstriction).	Decoction; herbal infusion.
Absinth wormwood	<i>Artemisia absinthium L.</i>	Полин гіркий	Whole territory of Ukraine	Illnesses of gastrointestinal tract (gastric secretions, gastritis, ulcer, colitis, gallbladder, liver and digestion disorders, lack of appetite); anaemia; insomnia; various mycobacteria and helminths; stomach spasms; tuberculosis; kidneys' and urinary bladder diseases; spleen diseases; alcoholism.	Crude herb; decoction; tincture.
Kitchen sage	<i>Salvia officinalis L.</i>	Шавлія лікарська	Whole territory of Ukraine	Angina, pharyngitis, gum disease, eyes inflammation; inflammatory processes in mucous membrane of the mouth; illnesses of gastrointestinal tract (gastritis, ulcer, gallbladder and liver disorders); inflammatory processes caused by <i>E. coli</i> ; pulmonary tuberculosis; urinary bladder diseases.	Decoction; herbal infusion.
Garden valerian	<i>Valeriana officinalis L.</i>	Валеріана лікарська	Whole territory of Ukraine	Nervous system disorders; cardiovascular system problems; thyroid disorders; stomach and intestine spasms; hypertension.	Decoction; herbal infusion; tincture; tablets and capsules.

St. John's wort	<i>Hypericum perforatum</i> L.	Звіробій звичайний	Whole territory of Ukraine	Illnesses of gastrointestinal tract (gastritis, ulcer, liver disorders); kidneys' and urinary bladder diseases; cardiovascular system problems; inflammatory processes caused by different bacteria; cankers, pharyngitis, gingivitis; laceration, septic wounds, burns.	Decoction; herbal infusion; tablets (antibiotic Novoimaninum).
Common marsh-mallow	<i>Althaea officinalis</i> L.	Алтея лікарська	Whole territory of Ukraine	Illnesses of gastrointestinal tract (gastritis, ulcer, colitis, diarrhea); kidneys' diseases; urinary bladder diseases; angina, pharyngitis, gum disease, eyes inflammation; eczema and psoriasis; respiratory infections, bronchitis, asthma, pulmonary tuberculosis.	Decoction; herbal infusion; syrup.
Red clover	<i>Trifolium pratense</i> L.	Конюшина лучна	Whole territory of Ukraine	bronchopulmonary diseases (bronchitis, laryngitis, asthma); anaemia; cystitis; kidneys' diseases; cardiovascular system problems; atherosclerosis; headaches; vitamin deficiency.	herbal infusion; decoction.
Blowball	<i>Taraxacum officinale</i> (L.) Weber ex F.H.Wigg.	Кульбаба лікарська	Whole territory of Ukraine	Illnesses of gastrointestinal tract (gastritis, cholecystitis, chronic constipation, cholelithiasis); atherosclerosis; diabetes; dermatological diseases; spleen diseases; kidneys' diseases; hemorrhoids; helminths; inflammation of the lymph nodes.	Crude herbs; herbal infusion; tincture; decoction.
Fireweed	<i>Chamaenerion angustifolium</i> (L.) Schur	Іван-чай звичайний	Majority of Ukrainian regions, including Khmel'nitska oblast	Prostatitis, benign prostatic hyperplasia, prostate cancer; weak immune system; body detoxifying; normalization of blood pressure; dysbacteriosis; nervous system disorders; vitamin deficiency; inflammatory processes caused by different bacteria; overweight; illnesses of gastrointestinal tract (gastritis, ulcer, colitis).	Herbal tea; herbal infusion; tincture; decoction.
Celandine	<i>Chelidonium majus</i> L.	Чистотіл великий	Whole territory of Ukraine	Dermatological diseases; illnesses of gastrointestinal tract (liver disorders, gallbladder, gastroenteritis, diarrhea).	Herbal infusion; tincture; crude herbs; decoction.

### **2.3. Motivation to Herbal Products' Consumption**

Generally, herbal medicine industry is one of the fastest growing industries in the world. The global pharmaceutical market was worth US \$550 billion in 2004, reached US \$ 710.2 billion in 2012 (Nirmal et al. 2013) and is supposed to reach up to US \$ 5 trillion by the year 2050 (Bhowmik et al., 2009).

Supply of herbal products in world is originated from low-income countries (Vasisht & Kumar 2002). China was the top country leading in the world in the export of herbals with US\$ 1.3 billion followed by India with an export figure of US\$ 790.56 million for the year 2010. Together both countries cover up to 80% of all supplies on world herbal products market (FAO 2012).

According to worldwide statistics, between major health problems because of which people use herbal products are cancer (43.1%), stroke (48.7%), and arthritis (43%) (Market research future 2019).

Literature analysis has shown that reasons for using herbal products by inhabitants of low- and high-income countries could be different. Citizens in high-income countries may prefer herbal products over or in combination with conventional treatment, but people in low-income countries seem to have fewer options to choose from (Ekor 2013).

People's main motivation to use herbal products in low-income countries are:

- their familiarity with these products;
- limited access to modern health care (Ekor 2013);
- religious believes and traditions (Astin 1998; Zeil 1999).

Among main motivators of intensive herbal products consumption in high-income countries are:

- aggressive advertisement campaigns of pharmacological companies (Dzeparoski & Trajkovic-Jolevska 2016);
- positive experience with herbal products of friends or relatives (Parle & Bansal 2006);
- claims on the effectiveness of plant medicines;
- preference of consumers for natural therapies;
- belief that herbal products are superior to manufactured products;
- dissatisfaction with the results from conventional medicine;
- high cost and side effects of most modern drugs;
- improvements in the quality, efficacy, and safety of herbal medicines with the development of science and technology;
- patients' belief that their physicians have not properly identified the problem;
- movement toward self-medication etc. (Bandaranayake, 2006).

Self-medication issue in terms of herbal products became another quite popular scientific topic. Between reasons of such behaviour usually are:

- uncomfot of patients to discuss their medical problems;
- fear of possible misdiagnosis and wrong treatment by patients with non-specific symptoms;
- lack of time to see a physician (Studdert et al. 1998).

It should be mentioned, that statement about existence of completely different reasons of herbal products usage in low- and high income countries does not have a superpower for all cases.

Thus, for instance, Brazil citizens consume HPs mainly because of believes in higher efficiency and lower side effects as well citizens of developed countries (Oreagba et. al 2011). Aggressive advertisement of herbal products has a big influence on consumption herbal products not only in the US, but also in Nigeria (Nnanwuba et al. 2019). And familiarity with some herbal products as well as family's traditions are important not only for inhabitants of developing countries, but also for Germans (Welz et al. 2018). Therefore,

we could conclude, that there is a deep need in studying specific for every nation factors, combination of which has influence on their herbal products' usage.

It should be also mentioned, that a quite big debate about economic effectiveness of herbal products exists. Numerous researches confirmed, that herbal products are especially cost-effective as prevention of illnesses and as medication in combination with conventional drugs in treatment of different diseases, in particular gastrointestinal, cardiovascular, stress and some others (Weeks 2000; Tais and Zoberg 2013; Herman et al. 2005; Coulter et al. 2013; Herman et al. 2012).

## 2.4. Factors Influencing Herbal Products' Consumption

Many researches has been devoted to analysis of socio-economic predictors of HPs consumption. Between such predictors are race, nationality/ethnicity, religious affiliation, age, gender, education, occupation, marital status, place of living and income. Race, nationality and religion have been eliminated from our study and age, gender, education, occupation, marital status, place of living and income have been included in it (Table 2).

**Table 2. Studies focusing on effect of socioeconomic factors on HPs' consumption**

<b>Factors</b>	<b>Studies including these factors</b>	<b>Countries, where studies conducted</b>
<b>Gender</b>	<b>Positive relationship:</b> Gardiner et al. 2007; Bardia et al. 2007; Nur 2010; Aziz 2009; Al-Windi 2004; Picking et. al. 2011; MacLennan et. al. 1996, 2002; Knotek et al. 2012; Aziz & Tey 2008; Kennedy 2005; Jibril et. al. 2019; Grace et. al. 2020; Touiti et. al. 2020; Ghazeeri et. al. 2012.	The US, Turkey, Malaysia, Sweden, Jamaica, Australia, the Czech Republic, Ghana, East Timor, Morocco, Lebanon.
	<b>Negative relationship:</b> Ghazali et. al. 2019; Hughes et. al. 2015; Kamel et. al. 2017; Al-Kindi et. al. 2011; Khalaf et. al. 2010; Rahayu et. al. 2020; Satyapan et. al. 2010; Astin 1998; Eisenberg et. al. 1993; Andel & Carvalheiro 2013.	South Africa, Saudi Arabia, Oman, Indonesia, Thailand, the US, Suriname.
<b>Age</b>	<b>Positive relationship:</b> Picking et. al. 2011; Gardiner et al. 2007; Eisenberg et. al. 1993; MacLennan et. al. 1996, 2002; Knotek et al. 2012; Rahayu et. al. 2020; Kennedy 2005; Al-Windi 2004; Jibril et. al. 2019.	Jamaica, the US, Australia, the Czech Republic, Indonesia, Sweden, Ghana
	<b>Negative relationship:</b> Andel & Carvalheiro 2013; Straughan & Roberts 1999; Grace et. al. 2020; Ghazali et. al. 2019; James et. al. 2018; Hughes et. al. 2015; Touiti et. al. 2020; Kamel et. al. 2017; Al-Kindi et. al. 2011; Khalaf et. al. 2010; Satyapan et. al. 2010; Ghazeeri et. al. 2012.	Suriname, the US, East Timor, Nigeria, Sierra Leone, South Africa, Morocco, Saudi Arabia, Oman, Bahrain, Thailand, Lebanon.

<b>Education</b>	<b>Positive relationship:</b> Picking et. al. 2011; Eisenberg et. al. 1993; MacLennan et. al. 1996, 2002; Astin 1998; Knotek et al. 2012; Rahayu et. al. 2020; Satyapan et. al. 2010; Kennedy 2005; James et. al. 2018; Nur 2010; Gardiner et al. 2007; Bardia et al. 2007; Ghazeeri et. al. 2012; Kaadaaga et. al. 2014; Coulson & Jenkins 2005.	Jamaica, the US, the UK, Australia, the Czech Republic, Indonesia, Thailand, Sierra Leone, Turkey, Lebanon, Uganda.
	<b>Negative relationship:</b> Andel & Carvalheiro 2013; Grace et. al. 2020; Ghazali et. al. 2019; Hughes et. al. 2015; Touiti et. al. 2020; Al-Kindi et. al. 2011; Khalaf et. al. 2010; Aziz & Tey 2008; Jibril et. al. 2019.	Suriname, East Timor, Nigeria, South Africa, Morocco, Oman, Bahrain, Malaysia, Ghana.
<b>Occupation</b>	<b>Positive relationship:</b> Picking et. al. 2011; MacLennan et. al. 1996, 2002; Rahayu et. al. 2020; Satyapan et. al. 2010; Touiti et. al. 2020.	Jamaica, the US, Australia, Indonesia, Thailand, Morocco
	<b>Negative relationship:</b> Andel & Carvalheiro 2013; Jibril et. al. 2019; James et. al. 2018; Hughes et. al. 2015; Touiti et. al. 2020; Kamel et. al. 2017; Al-Kindi et. al. 2011; Khalaf et. al. 2010; Grace et. al. 2020.	Suriname, Ghana, East Timor, Nigeria, Sierra Leone, South Africa, Morocco, Saudi Arabia, Oman, Bahrain.
<b>Marital status</b>	<b>Positive relationship:</b> Andel & Carvalheiro 2013; Aziz & Tey 2008; Kaadaaga et. al. 2014; MacLennan et. al. 1996.	Suriname, Malaysia, Uganda, Australia.
	<b>Negative relationship:</b> James et. al. 2018; Hughes et. al. 2015; Touiti et. al. 2020.	Sierra Leone, South Africa, Morocco.
<b>Place of living</b>	<b>Positive relationship:</b> Rahayu et. al. 2020; Kennedy 2005; Knotek et al. 2012; Gardiner et al. 2007; Eisenberg et. al. 1993.	Indonesia, the US, the Czech Republic.
	<b>Negative relationship:</b>	Suriname, East Timor, South Africa, Morocco.

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	Andel and Carvalheiro 2013; Grace et. al. 2020; Hughes et. al. 2015; Touiti et. al. 2020.
<b>Income</b>	<p><b>Positive relationship:</b>  Picking et. al. 2011; Eisenberg et. al. 1993; MacLennan et. al. 1996, 2002; Kennedy 2005; James et. al. 2018; Ghazeeri et. al. 2012; Aziz &amp; Tey 2008; Ghazali et. al. 2019; Kaadaaga et. al. 2014; Touiti et. al. 2020.</p> <p><b>Negative relationship:</b>  Andel and Carvalheiro 2013; Grace et. al. 2020; Hughes et. al. 2015; Astin 1998; Jibril et. al. 2019.</p>

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**Gender.** Some studies in Turkey (Nur 2010), Malaysia (Aziz & Tey 2008), Sweden (Al-Windi 2004), Jamaica (Picking et. al. 2011), Australia (MacLennon et. al. 1996), the Czech Republic (Knotek et. al. 2012), Lebanon (Ghazeeri et. al. 2012) confirmed the influence of gender on decision to use HPs and argued, that main HPs consumers are females.

Nevertheless, there are no reasons to claim the universality of these findings due to fact, that:

- 1) It has been proven, that in some other countries, for example, in Jamaica (Picking et. al. 2011), Ghana (Jibril et. al. 2019), East Timor (Grace et. al. 2020) and Morocco (Touiti et. al. 2020) HPs are used mainly by males.
- 2) In other countries, results are controversial. For example, some American researchers argue, that HPs in the US are consumed mainly by females (Gardiner et al. 2007; Bardia et al. 2007; MacLennan et. al. 2002; Kennedy 2005). However, other (Eisenberg et. al. 1993; Astin 1998) conclude, that there are no significant differences between HPs consumption and sex. Furthermore, the team of scientists in South Africa (Hughes et. al. 2015) has done the similar research twice and second time they received negative relationship result compared to the previous one.
- 3) It has been proven by studies in various countries that HPs consumption does not depend on gender. It is true, for example, for South Africa (Hughes et. al. 2015),



Saudi Arabia (Kamel et. al. 2017), Oman (Al-Kindi et. al. 2011), Bahrain (Khalaf et. al. 2010), Indonesia (Rahayu et. al. 2020), Thailand (Satyapan et. al. 2010), Nigeria (Ghazali et. al. 2019), the US (Eisenberg et. al. 1993; Astin 1998), Suriname (Andel & Carvalheiro 2013).

**Age.** As a predictor of HPs usage age was identified in Sweden (Al-Windi 2004), Jamaica (Picking et. al. 2011), Czech Republic (Knotek et al. 2012), Ghana (Jibril et. al. 2019), Indonesia (Rahayu et. al. 2020) and Australia (MacLennan et. al. 1996).

Majority of the US studies demonstrate the age influence on HPs' consumption as well (Gardiner et al. 2007; Eisenberg et. al. 1993; MacLennan et. al. 2002; Kennedy 2005). Nevertheless, some of them refuse statistical significance of this factor (Straughan & Roberts 1999). However, these studies disagree on the typical age of HPs' consumers even in the same country. In the US, for instance, some researchers agree with colleagues from Sweden (Al-Windi 2004) on the age group 45-64 years old, other convince that this group includes 45-49 years old (Eisenberg et. al. 1993) or even 15-54 years old (MacLennan et. al. 2002), which is similar to Australian findings – 18-54 years old (MacLennan et. al. 1996). In the Czech Republic (Knotek et al. 2012) it is 31-60 years old group; in Jamaica (Picking et. al. 2011) – 35-54 years old; in Indonesia (Rahayu et. al. 2020) – 40 years old and over. Probably the youngest HPs' consumers among those we found are in Ghana: between 21 and 30 years old.

At the same time, there are many studies in different countries, which did not find any significant influence of people's age on their decision to use HPs. Among them are Suriname (Andel & Carvalheiro 2013), East Timor (Grace et. al. 2020), Nigeria (Ghazali et. al. 2019), South Africa (Hughes et. al. 2015), Morocco (Touiti et. al. 2020), Saudi Arabia (Kamel et. al. 2017), Oman (Al-Kindi et. al. 2011), Bahrain (Khalaf et. al. 2010), Thailand (Satyapan et. al. 2010), Sierra Leone (James et. al. 2018) and Lebanon (Ghazeeri et. al. 2012).

**Education.** Very often education is considered as important predictor of HPs' usage. Again, there are no universal answer on the question “What should be the level of education to consider person as a potential HPs' consumer?” First, it depends on specific country. Thus,

for example, typical Czech HPs' consumers have secondary education (Knotek et al. 2012). But in many other countries like Turkey (Nur 2010), the US (Gardiner et al. 2007; Eisenberg et. al. 1993; MacLennan et. al. 2002; Astin 1998; Kennedy 2005; Bardia et al. 2007), Australia (MacLennan et. al. 1996), Jamaica (Picking et. al. 2011), Thailand (Satyapan et. al. 2010) HPs consumers have higher education – typically, colleague or university degree.

As opposed to them, typical HPs consumers in Indonesia (Rahayu et. al. 2020), Sierra Leone (James et. al. 2018), Lebanon (Ghazeeri et. al. 2012), Uganda (Kaadaaga et. al. 2014) and the UK (Coulson & Jenkins 2005) are less educated people with primary level of education or bellow.

**Occupation.** Significant influence on HPs' consumption in Thailand (Satyapan et. al. 2010) has government officer's occupation, in Indonesia (Rahayu et. al. 2020) – informal workers. In Jamaica (Picking et. al. 2011) occupation has no significant influence, but employment status showed significant influence. Typical HPs' consumers are employed there. Similar findings were explored in the US (MacLennan et. al. 2002) and Australia (MacLennan et. al. 1996). In contrast to them, HPs' consumers in Morocco (Touiti et. al. 2020) are mainly unemployed.

Occupation does not have any significant influence on HPs' consuming in Suriname (Andel & Carvalheiro 2013), Ghana (Jibril et. al. 2019), East Timor (Grace et. al. 2020), South Africa (Hughes et. al. 2015), Sierra Leone (James et. al. 2018).

**Marital status.** Majority of researches did not include marital status into the list of possible HPs' consumption predictors. Nevertheless, in four of them it was significant: in Uganda (Kaadaaga et. al. 2014), Malaysia (Aziz & Tey 2008) and Suriname (Andel & Carvalheiro 2013) herbal medicine users were mainly married people, but in Australia (MacLennan et. al. 1996) – never married.

Marital status does not play any role in consumers' decision to use HPs in the South Africa (Hughes et. al. 2015), Sierra Leone (James et. al. 2018), Morocco (Touiti et. al. 2020).

**Place of living.** Researches show, that in Indonesia (Rahayu et. al. 2020) mainly inhabitants of rural areas consume HPs, in the Czech Republic – urban (Knotek et al. 2012).

The definition “Place of living” in the US is mostly considered from the geographic point of view. Several studies showed, that HPs’ consumers are living on the West of the country (Gardiner et al. 2007; Eisenberg et. al. 1993; Kennedy 2005).

Studies conducted in Suriname (Andel and Carvalheiro 2013), East Timor (Grace et. al. 2020), South Africa (Hughes et. al. 2015) and Morocco (Touiti et. al. 2020) did not confirm any significance of this factor.

**Income.** Researches conducted in Malaysia (Aziz & Tey 2008), Uganda (Kaadaaga et. al. 2014) and Australia (MacLennan et. al. 1996) showed, that HPs consumers usually have higher income. Two studies in the US (Eisenberg et. al. 1993; MacLennan et. al. 2002) confirmed this trend, but another one (Astin 1998) did not.

At the same time, studies in other countries demonstrate, that not only high income could predict the HPs’ consumption, but the lower one, which is true for Nigeria (Ghazali et. al. 2019), Morocco (Touiti et. al. 2020), Sierra Leone (James et. al. 2018) and Lebanon (Ghazeeri et. al. 2012).

As we already mentioned, some scientists did not find any significant differences according to income in the US. Besides that, it has not been found in Suriname (Andel and Carvalheiro 2013), Ghana (Jibril et. al. 2019), East Timor (Grace et. al. 2020) and South Africa (Hughes et. al. 2015) as well.

## **2.5. Herbal Products in Ukraine: Historical Background and Legislation**

Ukraine is characterized by a considerable diversity of plants species because its location in different natural zones. There are more than 6 000 species of vascular plants in Ukraine (native, naturalized, occasionally introduced, and most common cultivated taxa) (Minarchenko 2017).

More than 2 200 species (around 10% of them are cultivated and introduced plants; the rest, including 537 threatened species, are growing in the wild) were investigated to some extent as medicinal plants containing biologically active substances which are used at present or can be used in the future for medicinal purposes, including production of commercial drugs (Minarchenko 2005, 2011).

Herbal products played a vital healing role in Ukraine. About 200 plant species are used in official (conventional) Ukrainian medicine and almost 400 provide raw materials for homeopathic preparations. The traditional medicine of Ukraine uses the raw material from over than one thousand species of plants. The raw materials of 20-30 species is used in large amount (more than one ton) as a source of biologically active agents (plants which are sources of antioxidants, tocopherols, carotenoids, flavonoids and other useful substances) (Minarchenko 2011).

The first written record about usage of HPs on the territory of modern Ukraine dates back to the times of Kyivan Rus' (X century). After a political decision of the ruler of Kyivan Rus' Volodymyr the Great to make a "Christianization" in 988, many religious missionaries from Greece came and brought to the state HPs knowledge of Early Greek medicine (Shikov A. et al. 2014). As a result, Ukrainian monasteries became the centers of herbal medicine practicing with own hospitals and even herbs drug stores. Thus, for instance, the very first pharmacy with HPs has been established in the hospital of Kyivo-Pechers'ka Lavra in 1005–1010 by the monk Makoveit from Athos (Shikov et al. 2014).

Nevertheless, later local herbalists advanced the HPs knowledge significantly. For example, they found new healing properties of herbs and analysed species, which were not studied before. All these findings were described in medical treatise “Mazi” (“Balsams”) of another ruler of Kyivan Rus’ Volodymyr Monomach grandchild Yevpraksiya-Zoya (Tychkivska 2009), published in XII century.

During next X-XII centuries, the healing effects of HPs were studied successfully in Kyivan Rus’. This conclusion could be made even based on simple fact, that in the thirteenth century local herbalists started to use mold as a natural antibiotic 700 years before official development of penicillin in the UK (Solovieva 2005).

But disintegration and breakdown of Kyivan Rus’, followed by many wars and separation of the territory of modern Ukraine between numerous of states during XII-XX centuries did not create enabling environment for further development and establishing official health care system, based on HPs’ utilization. Nevertheless, knowledge about HPs’ usage was continuing to function on the level of orally transmitted traditions, passed on from generation to generation (Shikov A. et al. 2014).

New era of increasing the role of HPs in health care system, started in the mid of XX century, during the World War II. In 1943, Joseph Stalin ordered to derivate from herbs new medication, which helps Soviet soldiers to become more resistant against stress and strong physical exertion (Panossian, & Wikman 2009).

After the World War II, the Soviet government continued to finance different HPs’ researches, which led to numerous findings and discovering of new healing perspectives of many HPs (Zevin et al. 1997; Hammerman 1964; Toorova 1974). Since that time, the HPs’ in the USSR have been tested for safety and efficiency in the same way as synthetic drugs (Domarew et al 2002).

Since 1991, when Ukraine declared its independence and The Soviet Union collapsed, medical plant cultivation in Ukraine faced a crisis and amount harvested decreased 10-20

times compared to the 1980s (Minarchenko 2011) with followed increase by 17.4% in 2014-2016 (Antimonopoly Committee of Ukraine 2017). Nevertheless, country exports HPs for US\$ 7-10 millions every year to other countries (mainly to Poland, Germany and Latvia) (UBR 2018), which is less than 0.05% of total Ukrainian export (The Observatory of Economic Complexity 2020).

Despite the fact, that compared to Soviet times doctors started to prescribe HPs less often, Ukrainians continue to use them actively and even try to replace some synthetic drugs by HPs even without medical prescription (Makukh et al. 2016).

There are some other differences in HPs utilization in Ukraine in comparison to the USSR. First of all, in legislation, where the difference between HPs as official medication and dietary supplements occurred (State service of Ukraine for medication and drugs control 2020; Ukrainian Ministry of Health 2018; Cratia 2018).

At present about 20% of the drugs authorized by the Ukrainian Ministry of Health are produced from raw materials of medicinal plants and almost 50% contain biologically active substances from plants (Minarchenko 2000). Such HPs, which are officially recognized as medication should be licensed. Technically, it means, that all detailed documents about its usage, confirmation of safety for people, possible adverse reactions as well as methods of processing, production, quality control etc., must be approved by the State service of Ukraine for medication and drugs control and Ukrainian Ministry of Health. This procedure is usually 3-5 times more expensive and lasts much longer (up to one year), than simple registration of dietary supplement (Cratia 2018).

Thus, there were introduced some restrictions, which are supposed to measure possible abusing of law by some producers with aim to not to talk about its products on behalf of medicine.

Firstly, dietary supplements should be sold on a shelf with a title “Dietary supplements”. Secondly, advertisement of dietary supplements is legal only after official improvement of mentioned state institutions. Finally, it is forbidden to use names of diseases in its package insert (Cratia 2018).

### **3. Aims of the Thesis**

#### **3.1. Objectives of the Thesis**

The main objective of thesis is to evaluate the attitudes of Ukrainian adult consumers toward herbal products. The specific objectives are:

- To identify which HPs and how often do Ukrainians use;
- To reveal the main health reasons for using specific HPs;
- To describe preferred forms of usage HPs;
- To identify the main sources of information about HPs;
- To define preferred places, where people get HPs from (buy/collect themselves);
- To identify which socioeconomic factors (gender, age, education, occupation, marital status, place of living (urban/rural area), income) influence using of HPs in Ukraine.

## 3.2. Research Questions and Hypotheses

This thesis is an attempt to fill the existing scientific gap by finding answers on following research questions:

- 1) Does herbal market in Ukraine is similar to other low-income countries, or the other way around – has more similarities with high-income countries?
- 2) What are specific characteristics of HPs' consumers in Ukraine?

Based on the literature review, following hypothesis were selected:

**1) H1. Gender is significant factor that influences the HPs consumption.**

Several previous studies confirmed that gender influence the consumption of HPs (Gardiner et al. 2007; Bardia et al. 2007; Nur 2010; Aziz 2009; Al-Windi 2004; Picking et. al. 2011; MacLennan et. al. 1996, 2002; Knotek et al. 2012; Aziz & Tey 2008; Kennedy 2005; Jibril et. al. 2019; Grace et. al. 2020; Touiti et. al. 2020; Ghazeeri et. al. 2012).

**2) H2. Age is significant factor that influences the HPs consumption.**

It was previously confirmed by different studies that age plays important role in HPs' consumption (Picking et. al. 2011; Gardiner et al. 2007; Eisenberg et. al. 1993; MacLennan et. al. 1996, 2002; Knotek et al. 2012; Rahayu et. al. 2020; Kennedy 2005; Al-Windi 2004; Jibril et. al. 2019).

**3) H3. The level of education influences usage of HPs.**

Some studies showed, that the level of education is one of the important socioeconomic factors, which could have influence on HPs' consumption (Picking et. al. 2011; Eisenberg et. al. 1993; MacLennan et. al. 1996, 2002; Astin 1998; Knotek et al. 2012; Rahayu et. al. 2020; Satyapan et. al. 2010; Kennedy 2005; James et. al. 2018; Nur 2010; Gardiner et al. 2007; Bardia et al. 2007; Ghazeeri et. al. 2012; Kaadaaga et. al. 2014; Coulson & Jenkins 2005).



**4) H4. Occupation is significant factor that influences the HPs consumption.**

Some researches argue that the HPs' consumption depends on occupation of respondents (Picking et. al. 2011; MacLennan et. al. 1996, 2002; Rahayu et. al. 2020; Satyapan et. al. 2010; Touiti et. al. 2020).

**5) H5. Marital status is significant factor that influences the HPs consumption.**

Various studies demonstrate correlation between marital status and consumption of HPs in different countries (Andel & Carvalheiro 2013; Aziz & Tey 2008; Kaadaaga et. al. 2014; MacLennan et. al. 1996).

**6) H6. Place of living significantly influence the consumption of HPs.**

It was proved, that there is a difference regarding HPs' consumption between rural and urban population (Rahayu et. al. 2020; Kennedy 2005; Knotek et al. 2012; Gardiner et al. 2007; Eisenberg et. al. 1993).

**7) H7. Income is significant factor that influences the the HPs consumption.**

In many studies worldwide it was confirmed that income of the consumers is influencing their preferences and attitudes towards usage of HPs (Picking et. al. 2011; Eisenberg et. al. 1993; MacLennan et. al. 1996, 2002; Kennedy 2005; James et. al. 2018; Ghazeeri et. al. 2012; Aziz & Tey 2008; Ghazali et. al. 2019; Kaadaaga et. al. 2014; Touiti et. al. 2020).

## **4. Materials and Methodology**

### **4.1. Research Design, Sampling Strategy and Data Collection Methods**

There were used two main data sources in the research: primary and secondary data. The main sources of secondary data of the research are scientific journals and articles, which author found in different scientific databases (Web of Science, ScienceDirect, Google Scholar) and used for writing theoretical background of the study as well as preparation its discussion part. Another important source of secondary data, used in this thesis, was relevant statistical information from both Ukrainian national and international institutions.

Primary data were collected through a semi-structured questionnaire-based survey by face-to-face interview. For collecting these data, convenience sampling method has been chosen, which allowed the researcher, who was working alone, to collect data in relatively fast and inexpensive way. The author personally in Ukrainian language interviewed the respondents who participated voluntarily and anonymously.

The sample size of 385 respondents has been defined by using online sample size calculator Raosoft (Raosoft 2019), based on number of pilot region inhabitants, convenience level 95% and marginal error 5%. Respondents were specified as 18-75 years old adult inhabitants of both rural and urban areas.

The fieldwork has been carried out during two month since the beginning of August 2019 until the end of September 2019 in 20 towns and 20 districts of the region.

## 4.2. Questionnaire Design

The questionnaire consisted of 17 questions. There were mainly close-ended questions used in the questionnaire:

- close-ended dichotomous questions;
- close-ended one choice questions;
- close-ended Likert-type scale (Likert 1932) questions.

In five questions, it was possible to add respondent's own note.

The structure of questionnaire was divided into three sections. Section 1 focused on information about familiarity of respondents with term "herbal products", identifying how many of them use HPs, which ones exactly, how often and because of which health reasons.

Section 2 contains questions (1) to reveal if Ukrainians consider HPs as cheaper, safer or more efficient medication, than synthetic drugs or the other way around; (2) understand if people have any preferences in using HPs (first of all, like seasons or forms of HPs) as well as sources of getting information about them or places, where people get HPs from.

Section 3 aims to collect sociodemographic characteristics of respondents, namely gender, age, education, employment, residential area, marital status and net family income.

When the process of questionnaire creation was finished, its pre-test in July, 2019 has been made. All appropriate modifications of questions were finished before the data collection phase of the research (August-September, 2019).

### 4.3. Study Area

As a target area for conducting research Khmel'nitska oblast has been chosen due to rich natural conditions (several natural reserves, including the biggest in Ukraine Podil'ski Tovtry National Nature Park, are situated there) and high number of herb species represented there, around 1,500 species of herbs from more than 100 families (25% of all species, represented in Ukraine) (Minarchenko 2011).

Khmel'nitskiy region is situated on the South-West part of Ukraine, close to the borders with Moldova and Romania (Figure 1). According to the official statistical data (Statistical service office 2019) its area occupied just 3.4% of the whole territory of Ukraine (20.6 thousands square kilometers). Estimated population is 1.28 million of people (2019): 54.5 % urban (697.6 thousands) and 45.5 % - rural (582.4 thousands) (Statistical yearbook of Khmel'nitska oblast 2018).

**Figure 1. Study area in Ukraine**



Source: Regions of Ukraine 2020

In 2019, the region was divided into 20 districts with centers in 20 biggest towns<sup>1</sup> (Table 3, made based on data from Statistical service office 2019):

**Table 3. Administrative division of the study area**

<b>District centers in Khmel'nitska oblast, 2019</b>	
<b>Name of the town</b>	<b>Population, thousands</b>
Khmel'nitskiy	274.8
Kamianets-Podil'skiy	100.3
Shepetivka	42.1
Netishyn	36.9
Slavuta	35.6
Starokostiantyniv	34.8
Polonne	21.1
Krasyliv	19.1
Volochys'k	19.0
Iziaslav	16.7
Gorodok	16.2
Dunaivt'si	16.1
Letychiv	10.4
Derazhnia	10.2
Yarmolynt'si	7.5
Poninka	7.2
Teofipol'	6.6
Vin'kivt'si	6.2
Stara Syniava	5.4
Bilogirja	5.3

<sup>1</sup> In 2020, the number of districts has been reduced to three (with administrative centers in Khmel'nitskiy, Kamianets-Podil'skiy and Shepetivka) as a part of decentralisation's reform (NGP 2020).

There is one of five nuclear power plants in Khmel'nitska oblast (in Netishyn district) and 31 colleges and universities. There are a dozen of big machine-building and light industry factories, where 44.2% of all employees work. In agriculture sector engaged around 11% of local population. There are mainly cultivated wheat, barley, pea, oat, buckwheat, corn, sugar beet in the region. Popular are gardening and livestock raising (Statistical yearbook of Khmel'nitska oblast 2018).

#### 4.4. Data Analysis

The fieldwork resulted in the collection of 400 questionnaires, 69 of them were marked as not appropriate for analysis due to the missing information. Thus, 331 questionnaires were valid to analyze.

All data were processed and analyzed using Microsoft Excel version 2016 and IBM SPSS® Statistics predictive analysis software (V. 25) after finishing the process of data coding and cleaning. Descriptive statistics were used to summarize the main features of the sample. Binary logistic regression model was used to identify the influence of socioeconomic factors on the consumption of herbal products. Hypotheses were tested by this method in IBM SPSS® Statistics predictive analysis software (V. 25). The model assumptions were tested for multicollinearity using the Variance Inflation Factor (VIF) and Tolerance, these tests are important to account for interdependency existence among independent variables.

As a rule,  $Tolerance = 1 / VIF$ . To confirm that there is no multicollinearity, the value of VIF should be less than 10, consequently, the value of Tolerance should be higher than 0.1.

The binary regression model is specified as follow (James et al. 2013):

$$Y = \text{Ln} \left( \frac{P}{1 - P} \right)$$

$$\text{Ln} \left( \frac{P}{1 - P} \right) = b_0 + b_1 x_1 + b_2 x_2 + \dots + b_5 x_5 + e$$

Where:

Y = Dependent Variable (Yes = 1, No = 2)

P = Probability of the event Y (Probability of herbal products' consumption)

Ln = Natural logarithm function

$b_0$  = Constant

$b_1$ - $b_6$  = Regression coefficients

$x_1$ - $x_5$  = Explanatory variables

e = Stochastic error term to introduce all of the variation in Y that cannot be explained by the included X

$P/1$  = Odd ratios (odd in favour to consume herbal products).

The model specification is summarized in the following table:

**Table 4. Description and measurement of the study variables used in binary logistic regression model**

<b>Study variables</b>	<b>Description and categories</b>	
<b><u>Dependent variable:</u></b>		
Consumption of herbal products	1 – Yes	2 – No
<b><u>Independent variables:</u></b>		
<b>Gender</b>	1 – Male	2 – Female
<b>Age</b>	1 – 18-29 years 2 – 30-39 years 3 – 40-49 years 4 – 50-59 years 5 – Above 60 years	
<b>Educational level</b>	1 – Primary 2 – Vocational 3 – Secondary 4 – University	
<b><u>Occupation:</u></b>		
Student	1 – Yes	2 – No
Employed	1 – Yes	2 – No
Entrepreneur	1 – Yes	2 – No
Unemployed	1 – Yes	2 – No
Retired	1 – Yes	2 – No
Maternity leave	1 – Yes	2 – No
<b><u>Marital status:</u></b>		
Single, divorce, widowed	1 – Yes	2 – No
Married, living with a partner	1 – Yes	2 – No
<b>Residential area</b>	1 – Urban	2 – Rural
<b>Income:</b>	1 – 1.000-3.000 hryvnias 2 – 3.001-5.000 hryvnias 3 – 5.001-10.000 hryvnias 4 – 10.001-20.000 hryvnias 5 – Above 20.000 hryvnias	



## 5. Results

### 5.1. Respondents' Characteristics

In total, 87.3% of respondents were women. The majority of the respondents (65.9%) are 18-39 years old: 28.7% of them have the age between 18 and 29 years; 37.2% – between 30 and 39 years. There are no people with primary education in our sample. Majority of them – 61.3% has university degree. Participants of our survey mainly live in urban area. This fact confirmed 70.1% of them. 45.6% of respondents are employed. The family income of absolute majority of them (63.1%) does not exceed 10.000 UAN (approximately 370 USD); families of 26.9% respondents get monthly between 5.001 and 10.000 UAN (185-370 USD); families of 18.1% respondents – between 3.001 and 5.000 UAN (111-185 USD) and families of another 18.1% respondents survive with amount of money between 1.000 and 3.000 UAN (37-111 USD). Typical participant of our survey is highly educated female, married, or lives with a partner.

The socioeconomic characteristics of the respondents are listed in Table 5 bellow.

**Table 5. Socioeconomic characteristics of the respondents**

<b>Variables</b>	<b>Total amount of respondents n=331</b>	<b>Percentage of respondents</b>
<b>Gender</b>		
Female	289	87.3
Male	42	12.7
<b>Age (years)</b>		
18-29	95	28.7
30-39	123	37.2
40-49	77	23.3
50-59	29	8.8
over 60	7	2
<b>Education</b>		
Primary	0	0
Vocational	96	29
Secondary	32	9.7
University	203	61.3

<b>Residential area</b>		
Urban	232	70.1
Rural	99	29.9
<hr/>		
<b>Occupation</b>		
Employed	151	45.6
Student	11	3.4
Retired	13	3.9
Unemployed	59	17.8
Entrepreneur	46	13.9
Maternity leave	51	15.4
<hr/>		
<b>Income</b>		
1.000 - 3.000 hryvnias	60	18.1
3.001 - 5.000 hryvnias	60	18.1
5.001 - 10.000 hryvnias	89	26.9
10.001 - 20.000 hryvnias	101	30.5
More than 20.001 hryvnias	21	6.4
<hr/>		
<b>Marital status</b>		
Single / divorced / widowed /	77	23.3
Married / living with a partner	254	76.7
<hr/>		

## 5.2. Respondents' knowledge of Herbal Products, Frequencies and Reasons of Consumption

Analysis of respondents' answers shows, that 100% of survey participants know the term "herbal products" and 98.2% of them use HPs.

According to data from Figure 2, the level of familiarity of our respondents with HPs is quite high. Specific HPs do know from 2.7% (*Ribwort plantain*) to 24.8% (*Fireweed*) of all participants of the survey. Among the most popular HPs are *Peppermint* (81.9%), *Lemon Balm* (81.9%), *Camomile* (81.9%), *Pot marigold* (71.9%) and *St. John's wort* (69.2%).

**Figure 2. Frequency of selected HPs' usage**

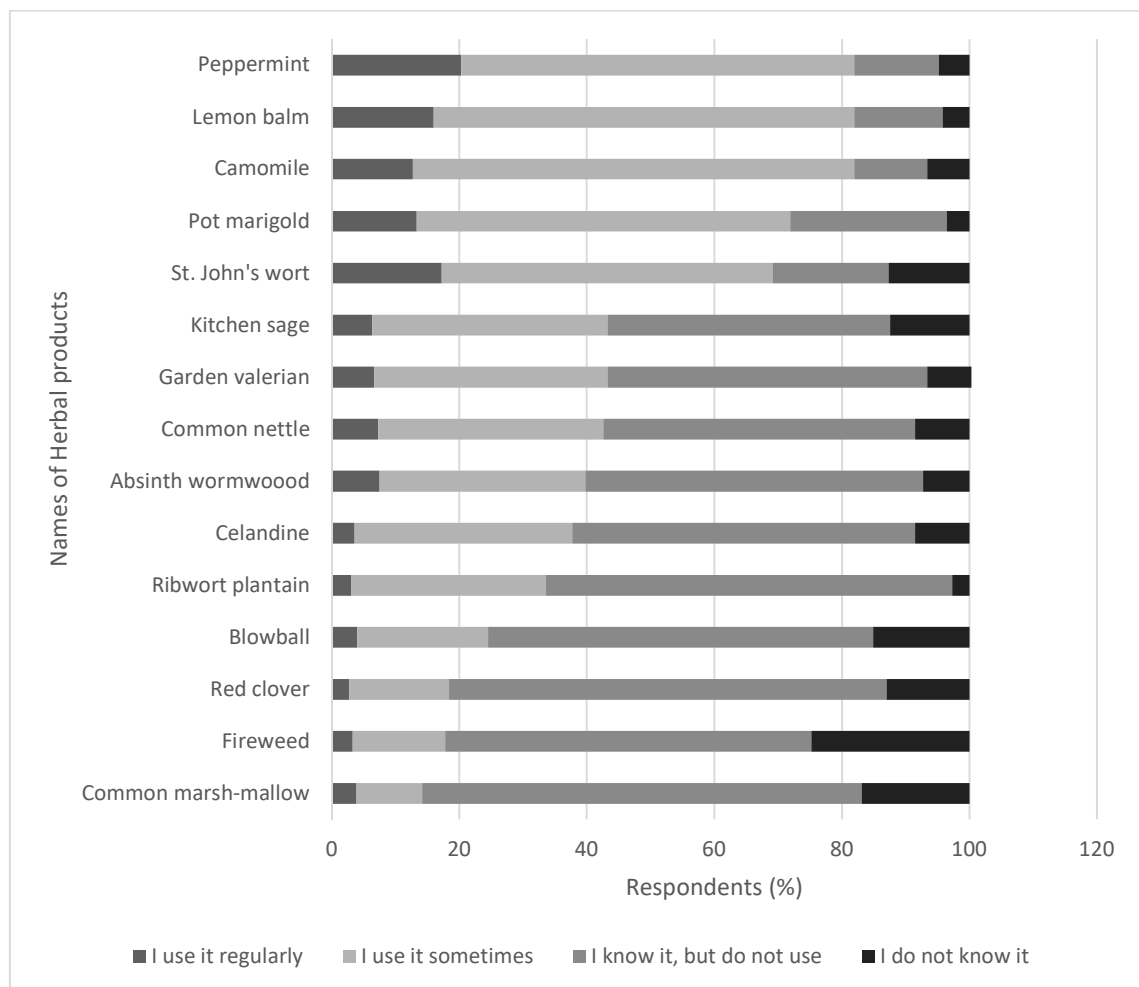
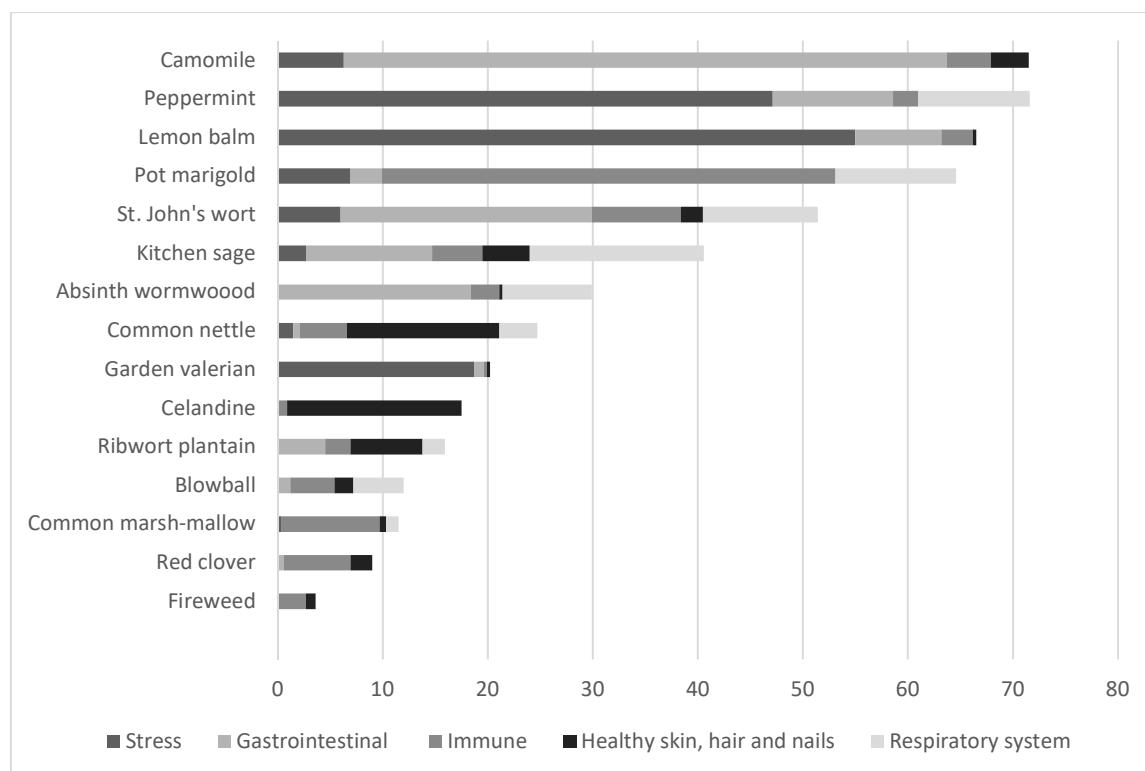


Figure 3 demonstrates, that among main health problems people try to solve by using HPs are stress, gastrointestinal, immune, respiratory issues as well as attempts to make skin, hair and nails healthier.

Against stress, respondents mainly use *Peppermint* (47.1%) and *Lemon balm* (55%). Gastrointestinal diseases the respondents are healing with *Camomile* (57.4%), *St. John's wort* (23.9%) and *Absinth wormwood* (18.4%). The most popular herbal medicine for improving immune system is *Pot marigold* (43.2%) and *Common marsh-mallow* (9.4%). The most popular HPs for healing respiratory diseases are *Kitchen sage* (16.6%), *Pot marigold* (11.5%), *St. John's wort* (10.9%) and *Peppermint* (10.6%). The most important HPs for healthy skin, hair and nails of the respondents are *Celandine* (16.6%) and *Common nettle* (14.5%).

**Figure 3. The most popular reasons of selected HPs' usage**



Nevertheless, there is some difference in HPs consumption between male and female consumers (Table 6). Among five the most common reasons why male respondents use HPs are reproductive and sexual health (61.9%), gastrointestinal tract problems (11.9%), stress

(11.9%), healthy sleep (11.9%) and immune system issues (9.5%). Meanwhile among female respondents this list is gastrointestinal tract problems (64%), stress (61.2%), immune system issues (48.1%), healthy skin, hair and nails (18.3%) and respiratory system sicknesses (17.6%).

**Table 6. Reasons for HPs' consumption by male and female respondents**

Reasons	Male		Female	
	%	Rank	%	Rank
Reproductive and sexual health (prostate, fertility, sexual activity)	61.9	1	6.9	10
Gastrointestinal tract (activity of bowels, digestion, liver, gall bladder)	11.9	2-3-4	64	1
Body's resistance against fatigue and stress	11.9	2-3-4	61.2	2
Healthy sleep and relaxation	11.9	2-3-4	13.5	7
Immune system and defensive capacity	9.5	5-6-7	48.1	3
Respiratory system (to facilitate coughing, clearing air passages)	9.5	5-6-7	17.6	5
Excretory system (kidneys, bladder, urinary tract)	9.5	5-6-7	13.1	8
Healthy skin, hair and nails	7.2	8	18.3	4
Weight loss or control body weight	4.8	9-10	4.2	12
Cardiovascular system (level of cholesterol, sugar, blood pressure, vascular health)	4.8	9-10	14.5	6
Physical and sport performance	2.4	11	3.5	13
Mental activity and performance (concentration, memory)	0	0	8.3	9
Musculoskeletal system (health and regeneration of joints, bones, tendons, muscles)	0	0	0.6	15
Ophthalmic health and support of eyesight	0	0	6.2	11
Premenstrual and menopausal comfort	0	0	1.7	14

### **5.3. Respondents' attitudes towards Herbal Products' Consumption**

Absolute majority of our respondents (97.6%) do not agree with a statement "HPs are not efficient at all; therefore they should not be consumed". Instead, 94.8% of them are convinced, that HPs are cheaper (70.4% totally agree and 24.5% - partly) and 81.8% - safer (44.4% totally agree and 37.5% - partly), than synthetic drugs. The amount of respondents, who think, that HPs are less efficient, than conventional medication is less than the amount of respondents with opposite opinion. With assumption "HPs are less efficient, than chemical drugs" agree 34.7% of respondents (1.5% totally agree and 33.2% - partly). Meanwhile, the assumption "HPs are more efficient, than chemical drugs" support 54.7% of respondents (13.3% totally agree and 41.4% - partly). At the same time 81.6% of respondents (46.2% totally agree and 25.4% - partly) support an idea, that HPs are not substitutes of conventional medication and should be used together with them to get a better healing effect.

Nevertheless, we observe some differences between male and female respondents (Table 7):

- Males consider HPs as safer and more efficient more often, than females. With assumption "HPs are safety alternative to chemical drugs" agree 88% of males and 80.9% females. Nevertheless, male respondents more often vote for combination of HPs with chemical drugs (78.6%) compare to female respondents (70.6%). The idea "HPs are more efficient, than chemical drugs" is supported by 66.6% of male respondents and 53% of female respectively. At the same time with assumption "HPs are cheaper than chemical drugs" agree 90.4% of male and 95.5% of female respondents;. At the same time, more male respondents vote for combination of HPs with chemical drugs (75.6%) compare to female respondents (73.5%);
- Just 1.7% of female respondents do not use HPs, while this rate is much higher among males – 7%.

**Table 7. Male and female respondents' attitudes to HPs**

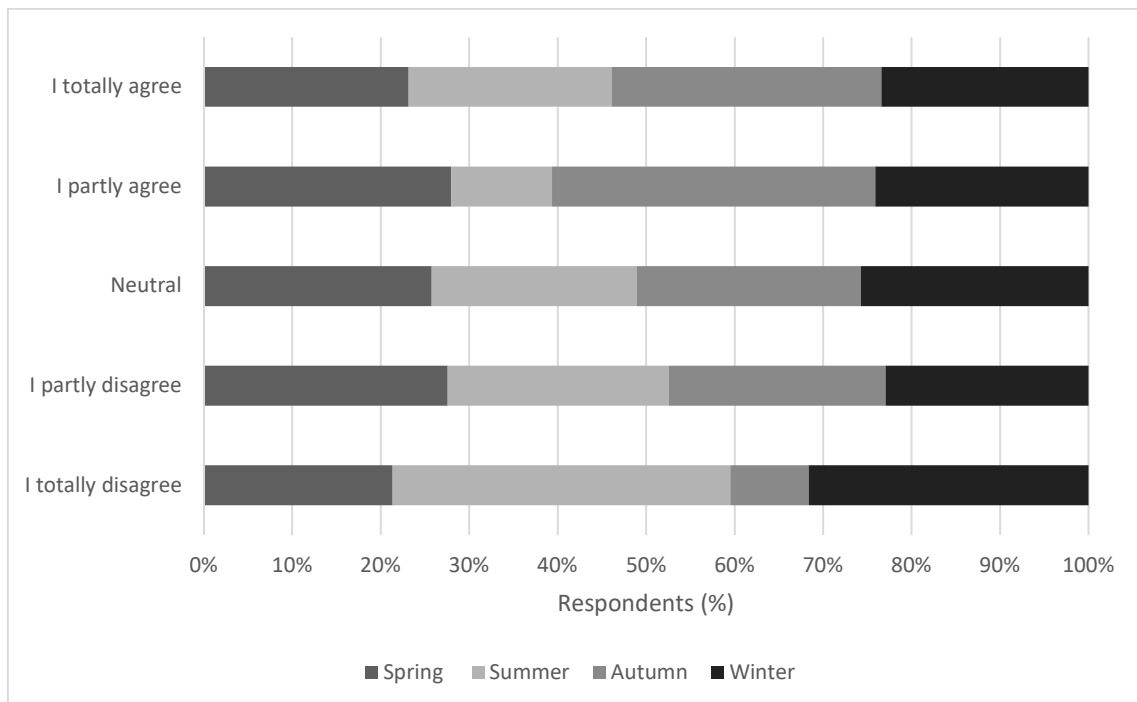
	I totally agree (%)		I partly agree (%)		Neutral (%)		I partly disagree (%)		I totally disagree (%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<b>Cheaper, than chemical drugs</b>	73.7	69.9	16.7	25.6	0	2.8	24	0	7.2	1.7
<b>Safety alternative to chemical drugs</b>	47.6	43.9	40.4	37	0	4.8	4.8	6.6	7.2	7.7
<b>More efficient, than chemical drugs</b>	18.9	12.5	47.6	40.5	9.6	14.2	16.7	19.4	7.2	13.4
<b>Not substitutes of chemical drugs, but should be used together with them</b>	40.5	47.1	38.1	23.5	0	10.4	9.5	9.7	11.9	9.3
<b>Less efficient, than chemical drugs</b>	7.2	0.7	26.2	34.3	23.8	13.2	23.8	25.9	19	25.9
<b>Not efficient at all</b>	7.3	1.7	0	0	0	0	0	0	92.7	98.3

According to the data from Figure 4 36.6% of respondents agree that spring influences HPs' consumption and 45.3% do not think so; 48.1% of respondents think, that autumn has some influence on HPs' consumption, nevertheless 34.2% of them have the opposite opinion; with idea, that winter influences HPs' consumption agree 35.7% of respondents and do not agree 46.2%. At the same time, majority of respondents (52.6%) disagree with suggestion, that summer has some influence on HPs' consumption and just 31.1% agree with that.

Majority of respondents in both male and female groups do not agree with statement, that any of the season could have some influence on HPs' consumption. For instance, 40.4% of males and 46% females do not think, that spring influences HPs' consumption (45.2% and 45.3% respectively agree with that). 54.8% of male respondents and 52.2% of female respondents disagree with suggestion, that summer influences HPs' consumption (38.5% and

31.5% respectively agree with that). 47.7% of male respondents and 32.1% of female respondents disagree with suggestion, that autumn influence on HPs' consumption (40.4% and 49.2% respectively agree with that). 42.9% of male respondents and 47.1% of female respondents disagree with idea, that winter influence on HPs' consumption (30.9% and 36.3% respectively agree with that).

**Figure 4. Seasonality in HPs' consumption**



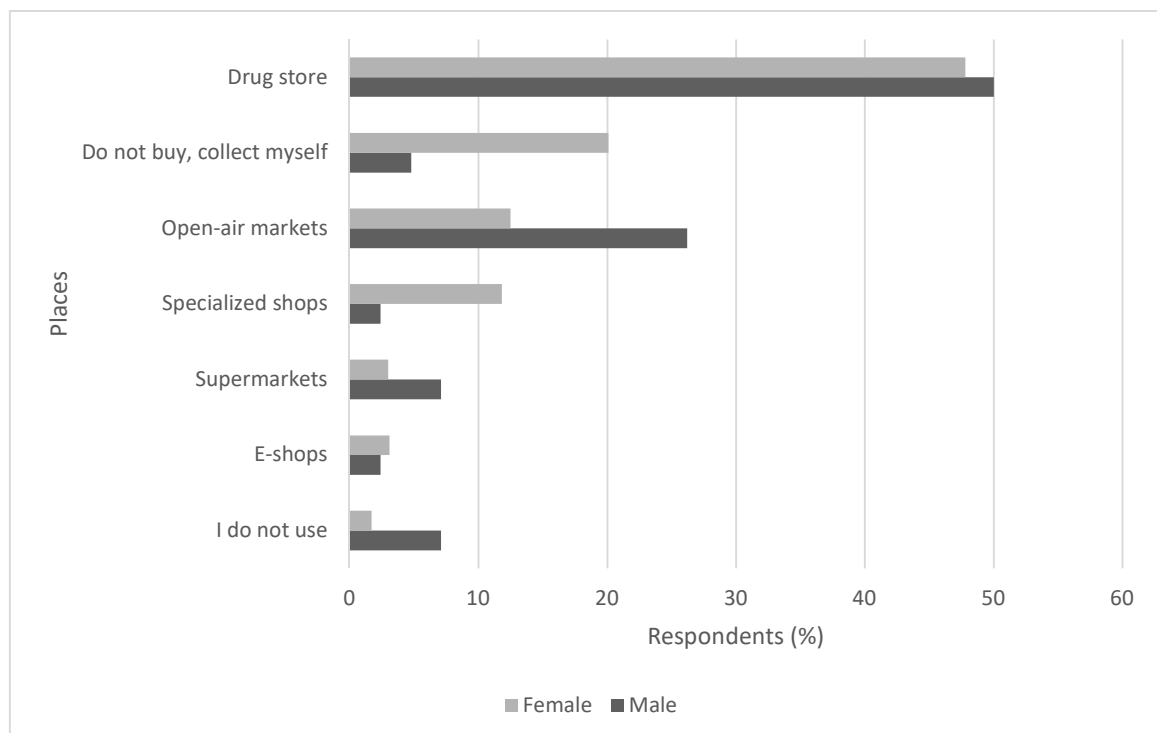


#### 5.4. Herbal Products' Markets and Information Sources

Almost a half of respondents (48%) buys HPs in drug store. Supermarkets and e-shops are not popular places to buy HPs (3.7% and 3% respondents buy HPs there respectively). 10.6% of them consume HPs from specialized shops, 14.2% - from open-air markets. 18.1% of respondents collect HPs themselves.

Figure 5 demonstrates, that female respondents more often buy HPs in special shops (11.8%), e-shops (3.1%) and gather them by themselves (20.1%) compare to male respondents (2.4%, 2.4% and 4.8% respectively). Male respondents more often buy HPs in supermarkets (7.1%), open-air markets (26.2%) and drug-store (50%), than female respondents (3%; 12.5% and 47.8% respectively).

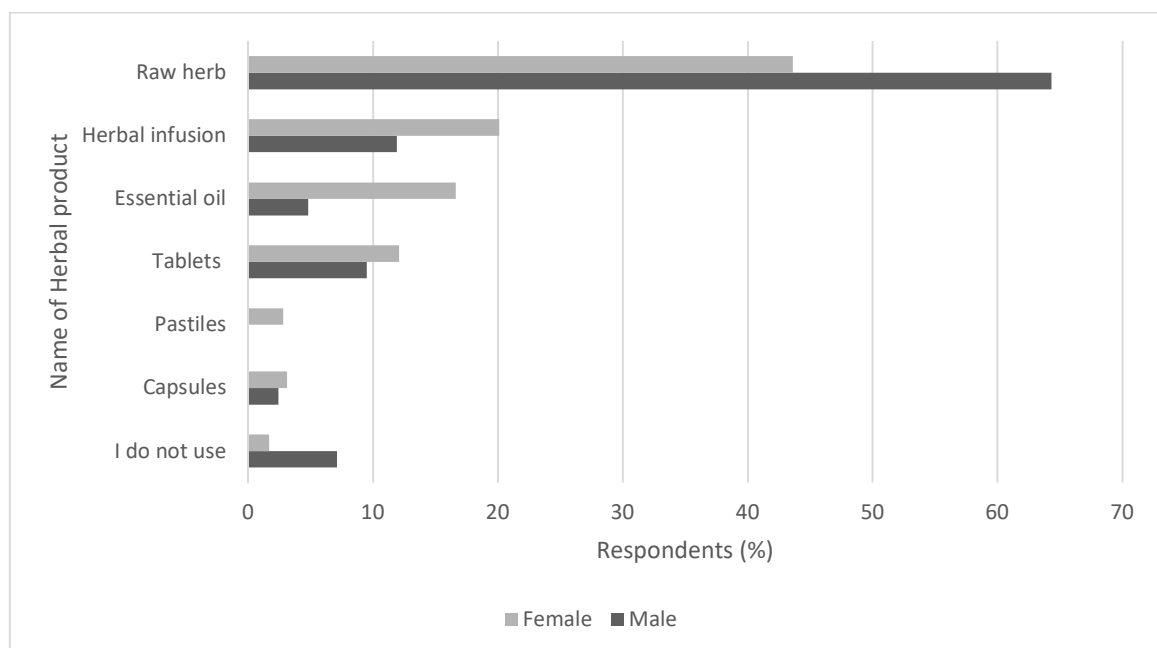
**Figure 5. Male and female preferred places for buying HPs**



The most popular form for usage HPs is raw herbs (46.2%), followed by herbal infusions (19%), essential oils (15.1%) and tablets (11.9%). At the same time, pastilles and capsules are not so popular (2.4% and 3% respectively).

Male respondents consume raw herbs more often (64.3%) compare to females (43.6%), but they do not buy HPs in pastilles, which use 2.8% of female respondents. The popularity of HPs in capsules is almost equal in both male (2.4%) and female (3.1%) groups of respondents. HPs in form of essential oil and herb infusion use 16.6% and 20.1% female compare to 4.8% and 11.9% male respondents respectively (Figure 6).

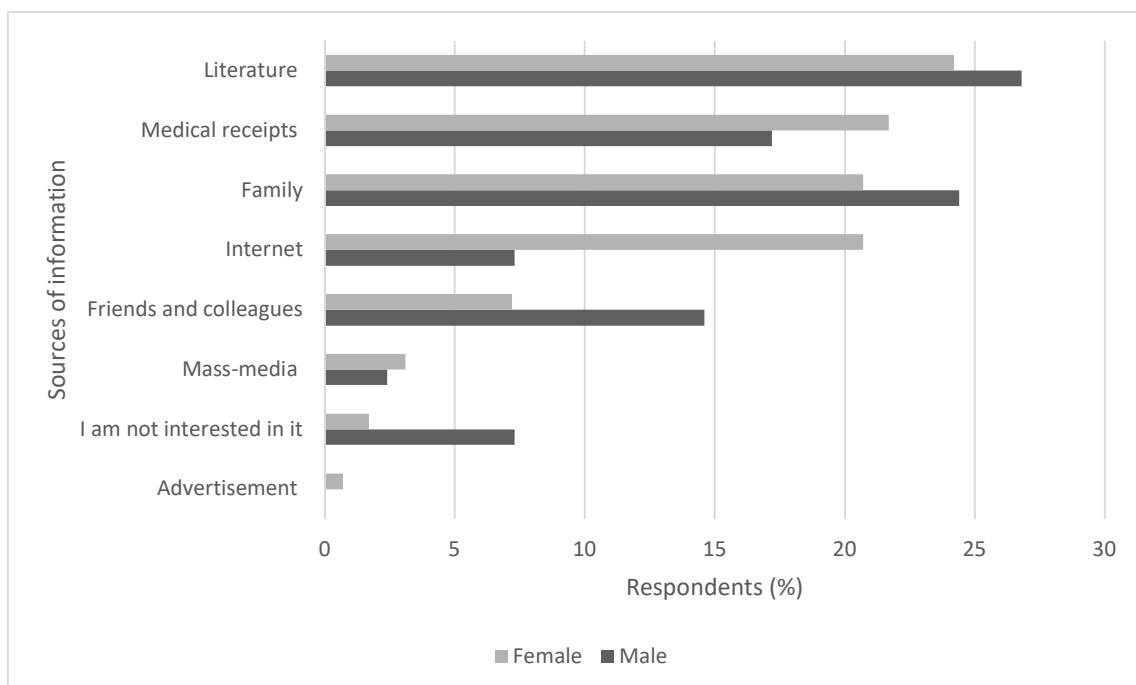
**Figure 6. Preferred forms of HPs' usage by male and female respondents**



According to respondents', their preferences to sources of information about HPs are distributed next way: the main source for 25.1% respondents is family, followed by literature (24.8%) and Internet (19%), doctor's prescription (17.2%), friends and colleagues (7.6%). The lowest number of respondents gets information about HPs from media (3.0%) and promotional materials (0.9%).

Figure 7 shows, that the lowest influence on both male and female respondents choice to consume HPs have advertisement (0 – male; 1% - female) and mass-media (2.4% - male; 3.1% - female). Male are more often, than female respondents get information about HPs from literature – 26.2% (females – 24.6%), family – 26.2% (females – 24.9%) and friends/colleagues – 14.3% (females – 6.6%). At the same time, female respondents more frequently than males informed about HPs from Internet – 20.8% (males – 7.1%) and medical receipts – 17.3% (males – 16.7%).

**Figure 7. Male and female respondents' preferred sources of information about HPs**



## 5.5. Factors Effecting Herbal Products' Consumption

To verify if predictor variables significantly predicted respondents' consumption of herbal products, logistic regression method has been chosen.

The model as a whole explained between 3.4% (Cox and Snell R square) and 20.4 % (Nagelkerke R square) of the variance in consumption of herbal products, and correctly classified 81.3 % of cases (Table 8).

**Table 8. Model summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1.	128.955 <sup>a</sup>	.034	.204

The results of logic regression analysis of factors effecting consumption of herbal products demonstrate (Table 9), that the only socioeconomic predictor of herbal products' consumption is gender (p-value – 0.047, significant at p-value  $\leq 0.05$ ). Odd ratio of this factor recorded at 0.126. It means that females are more likely to use HPs at 0.126 times than males, all other factors being equal. At the same time, Age, Occupation, Educational level, Place of living, Marital status and Income do not have any influence on HPs' consumption.

Two factors were excluded from the model: “Maternity leave” and “Married or living with a partner” as they have Tolerance value that equals 0 (perfect collinearity with other factors).

**Table 9. Results of logic regression analysis of factors effecting HPs' consumption**

Socioeconomic factors	B	S.E.	P-value	Odd Ratio
<b>Gender</b> (being female)	-2.072	1.045	<b>0.047*</b>	0.126
<b>Age</b>	-0.254	0.484	0.600	0.776
<b>Educational level</b>	0.143	0.524	0.785	1.154
<b>Residential area</b>	0.893	0.874	0.307	2.442

<b>Occupation:</b>				
Employed	-0.184	1.203	0.879	0.832
Student	14.157	10302.769	0.999	1406560.890
Retired	17.481	10231.653	0.999	3.909E7
Unemployed	-0.363	1.284	0.777	0.696
Entrepreneur	17.546	5331.518	0.997	4.168E7
<hr/>				
<b>Income</b>	-0.424	0.420	0.313	0.654
<hr/>				
<b>Marital status:</b>				
Single / divorced / separated	17.557	4101.633	0.997	4.216E7

\*= significant at  $p \leq 0.05$

Based on these data, we received through binary logistic regression analysis in IBM SPSS® Statistics predictive analysis software (V. 25), we can conclude, that:

**Hypothesis 1:** Statistical analysis confirmed the dependency between variables, p-value is 0.047 ( $p\text{-value} \leq 0.05$ ). Gender is a significant factor that influences the HPs' consumption.

**Hypothesis 2:** Statistical analysis did not confirm the dependency between variables, p-value is 0.600 ( $p\text{-value} \geq 0.05$ ). Age is not significant factor that influences the HPs' consumption.

**Hypothesis 3:** Statistical analysis did not confirm the dependency between variables, p-value is 0.785 ( $p\text{-value} \geq 0.05$ ). The level of education has no influence on HPs' consumption.

**Hypothesis 4:** Statistical analysis did not confirm the dependency between variables, p-value of all types of occupation we analyzed (Maternity leave was excluded from the model due to collinearity reasons) were higher than 0.05 (Table 9). Occupation has no influence on HPs' consumption.

**Hypothesis 5:** Statistical analysis did not confirm the dependency between variables. With only "Single" variable being tested, p-value is 0.997 ( $p\text{-value} \geq 0.05$ ). Marital status has no influence on HPs' consumption.

**Hypothesis 6:** Statistical analysis did not confirm the dependency between variables, p-value is 0.307 (p-value  $\geq$  0.05). Place of living has no influence on HPs' consumption.

**Hypothesis 7:** Statistical analysis did not confirm the dependency between variables, p-value is 0.313 (p-value  $\geq$  0.05). Income has no influence on HPs' consumption.

## 6. Discussion

### 6.1. Consumption of Herbal Products

The study was focused on HPs' usage in Ukraine. It has been found high level of familiarity with herbal products and high level of their usage by our respondents in the study area, which is comparable with another researches in low-income countries (Aziz & Tey 2008; Picking et. al. 2011; Ghazeeri et. al. 2012; Jibril et. al. 2019; Grace et. al. 2020; Touiti et. al. 2020; Al-Kindi et. al. 2011; Satyapan et. al. 2010).

Due to dose accuracy and convenience reasons the most popular form of herbal products consumption are tablets (Cision 2018). In Ukraine, tablets choose just 11.9% of respondents, popularity of pastilles and capsules is even lower (2.4% and 3% respectively). Our respondents prefer to use raw herbs – this do almost 46% of all HPs consumers, which is comparable with data from South Africa (83.9%) (Hughes et. al. 2015), Ghana (64%) (Jibril et. al. 2019), Suriname (72%) (Andel & Carvalheiro 2013), East Timor (60%) (Grace et. al. 2020), Indonesia (80%) (Rahayu et. al. 2020), Jamaica (72.6%) (Picking et. al. 2011) and others. These results of the study confirmed the global trend: low-income countries mostly consume crude herbs unlike high-income countries, where consumers prefer to buy processed products, for instance, tablets.

Ukrainians prefer to use local herbs, what confirms another world trend: low-income countries mainly utilize local herb species, unlike to high-income countries (with some exclusions), for instance, the USA, where 70% of the most popular commercialized herb species are imported (Knotek et. al. 2012).

The research findings confirmed results of similar study (Knotek et al. 2012), that two most popular herbal products are *Peppermint* and *Lemon balm*. Besides that, among other very popular herbal products are *Pot marigold*, *Camomile* and *St. John's wort*. The most popular herb among males is *Fireweed* (61.9% of male respondent use it), which they use to heal or prevent “men” diseases. These results correspondent with other study from Lebanon

(Ghazeeri et. al. 2012), where 90.2% of all males participated in similar study mainly use HPs in order to improve their sperm characteristics (sperm motility, production and/or quality).

According to our findings, 17.8% of respondents harvest herbs for their usage themselves. It is unusual for high-income countries, but very common in low-income ones. For instance, for Ghana, where 37% of population harvest herbs itself (Frances et. al. 2014); 42% in Suriname; 30% in East Timor – 30% and in Indonesia, Jamaica etc.

Based on results of survey, 14.2% of Ukrainians buy HPs at open-air markets. This is very typical for low-income countries, because there are large medicinal plant markets in urban centers in South America (Brandão et. al. 2006; Andel et. al. 2012; Bussmann & Sharon 2009), Africa (Andel et. al. 2012; Williams et. al. 2005; Olowokudejo et. al. 2008), Asia (Olsen & Larsen 2003; Lee et. al. 2008), the Caribbean (Mitchell 2011; Bye & Linares 1983) and the Middle East (Mati & De Boer 2011), which actually replace the traditional pharmacy. Nevertheless, at the same time, 48% of Ukrainians buy HPs in drug stores, which is not the case of low-income countries.

Absolute majority of all respondents (97.6%) do not agree with statement “Herbal products do not efficient at all, therefore they should not be consumed” and convinced, that they are cheaper (94.8%), safer (81.8%) and to some extent even more efficient, than synthetic drugs (54.7%). However, at the same time majority of respondents (81.6%) support an idea, that herbal products are not substitutes of conventional medication and should be used together with them to get a better healing effect. Therefore, according to results of other research Ukrainians try to combine herbal products with synthetic drugs and do it even without doctors’ prescription (Makukh et al. 2016), which is very similar to main trend in many low-income countries (Stojanović et al. 2017; Alonso-Castro et al. 2019; Oyelola et al. 2010).

Similar to previous research in Jordan (El-Dahiyat et al. 2020), Sierre Leone (James et al. 2018), South Africa (Hughes et al. 2015), Suriname (Andel & Carvalheiro 2014), it was found, that family is the main source of information about herbal products (25.1%), which is



dominant trend of mostly low-income countries; followed by literature (24.8%) and Internet (19%), doctor's prescription (17.2%), friends and colleagues (7.6%). The lowest number of respondents gets information about HPs from media (3.0%) and promotional materials (0.9%), which is controversial to already mentioned previous studies.

Mass-media and advertisement have quite high influence on usage herbs make, for example, in Lebanon, where 33.3% of respondents indicated its influence (Ghazeeri et al. 2014). At the same time, literature does not play any significant role in this process there. Ukrainian results are comparable in this context with the Czech Republic, where both family and literature are important predictors of HPs' usage (Knotek et al. 2012). However, in Ukraine, in contrast to the Czech Republic, mass-media and advertisement have just a little share (3%) in complete rating of HPs' information sources.

Furthermore, 17.2% of respondents declared that they received information about HPs from medical receipts, which is untypical for modern global self-medication trend. Probably it is linked to another study result, according to which majority of respondents consider HPs as cheaper, safer and even more effective in healing (94.8%, 81.8% and 54.7% respondents respectively), but at the same time agree, that HPs are not substitutes of chemical drugs and should be used in combination with them (81.6% of respondents). Concomitant usage of medical plants with pharmaceutical drugs is not unique for Ukraine. Similar incidents are observed in other countries, for instance, in Jamaica (Picking et al. 2011) and Suriname (Andel & Carvalheiro 2014).

## **6.2. Reasons for Herbal Products' Consumption**

Generally, reasons for consumption of HPs differ from one country to another. For instance, globally among major health problems, which motivate people to use herbal products are cancer, stroke and arthritis (Market research future 2019).

In the USA people consume them to prevent cardiovascular diseases, stimulate immunity system (Craig 1999) and as a treatment of obesity (Liu 2017; Sun et al. 2016).

In Brazil, people use herbal products to solve their digestive system problems, recover after respiratory illnesses and reduce pain (Pungartnik 2017; Simpson de Paula 2012).

In Ethiopia, herbal products are widely used in treatment stomach-aches, asthma, dysentery, malaria, evil eyes, cancer, skin diseases, and headaches (Moges & Moges 2019).

The research confirmed findings of other study (Knotek et al. 2012), which revealed, that main health problems people are trying to solve by using herbal products are gastrointestinal and immunity issues. Besides that, it was showed that another important reasons for using herbal products are attempts to make healthier skin, hair and nails as well as deal with stress and respiratory system sicknesses.

### **6.3. Factors Influencing the Herbal Products' Consumption**

Our survey participants were mainly female (87.3%). Predominantly female participated another similar research worldwide as well (Ghazali et. al. 2019; James et. al. 2018; Andel & Carvalheiro 2013; Aziz & Tey 2008). Nevertheless, we consider this fact as one of the limits of our study and therefore it is described more detailed in next chapter (Limitation of the research).

Several studies in Turkey (Nur 2010), Malaysia (Aziz & Tey 2008), Sweden (Al-Windi 2004), Australia (MacLennon et. al. 1996), the Czech Republic (Knotek et. al. 2012), Lebanon (Ghazeeri et. al. 2012) reported gender preferences in usage herbal products and made a conclusion, that they are used mainly by women.

This conclusion is confirmed by our study as well. We found, that gender is the only socioeconomic factor, which has influence on HPs' consumption in Ukraine. In general, females are more likely to use HPs at 0.126 times, than males.

However, in another countries, for instance, in Jamaica (Picking et. al. 2011), Ghana (Jibril et. al. 2019), East Timor (Grace et. al. 2020) and Morocco (Touiti et. al. 2020) HPs are used mainly by males.

Nevertheless, the correlation between gender HPs' consumptions has been not confirmed by results of the research in many countries: South Africa (Hughes et. al. 2015), Saudi Arabia (Kamel et. al. 2017), Oman (Al-Kindi et. al. 2011), Bahrain (Khalaf et. al. 2010), Indonesia (Rahayu et. al. 2020), Thailand (Satyapan et. al. 2010), Nigeria (Ghazali et. al. 2019), the US (Eisenberg et. al. 1993; Astin 1998), Suriname (Andel & Carvalheiro 2013) etc.

It was proved by research in Sweden (Al-Windi 2004), Jamaica (Picking et. al. 2011), the Czech Republic (Knotek et al. 2012), Ghana (Jibril et. al. 2019), Indonesia (Rahayu et. al. 2020), Australia (MacLennan et. al. 1996) and other countries, that age is important socioeconomic predictor of HPs' consumption.

Nevertheless, result of our study in Ukraine did not confirm any correlation between age of respondents and their consumption of HPs, which is similar with results in Suriname (Andel & Carvalheiro 2013), East Timor (Grace et. al. 2020), Nigeria (Ghazali et. al. 2019), South Africa (Hughes et. al. 2015), Morocco (Touiti et. al. 2020), Saudi Arabia (Kamel et. al. 2017), Oman (Al-Kindi et. al. 2011), Bahrain (Khalaf et. al. 2010), Thailand (Satyapan et. al. 2010), Sierra Leone (James et. al. 2018) and Lebanon (Ghazeeri et. al. 2012).

Despite the fact, that the level of education impacts HPs' consumption in many countries, including the Czech Republic (Knotek et al. 2012), (Nur 2010), the USA (Gardiner et al. 2007; Eisenberg et. al. 1993; MacLennan et. al. 2002; Astin 1998; Kennedy 2005; Bardia et al. 2007), Australia (MacLennan et. al. 1996), Jamaica (Picking et. al. 2011), Thailand (Satyapan et. al. 2010), Indonesia (Rahayu et. al. 2020), Sierra Leone (James et. al. 2018), Lebanon (Ghazeeri et. al. 2012), Uganda (Kaadaaga et. al. 2014) and the UK (Coulson & Jenkins 2005), we did not find any correlation between respondents' education and consumption of HPs. This result corresponds with similar findings in Suriname (Andel & Carvalheiro 2013), East Timor (Grace et. al. 2020), Nigeria (Ghazali et. al. 2019), South Africa (Hughes et. al. 2015), Morocco (Touiti et. al. 2020), Oman (Al-Kindi et. al. 2011), Bahrain (Khalaf et. al. 2010), Malaysia (Aziz & Tey 2008), Ghana (Jibril et. al. 2019).

Some studies showed significance of occupation or employed status in HPs' usage. Among them are results from Thailand (Satyapan et al. 2010), Indonesia (Rahayu et. al. 2020), Jamaica (Picking et. al. 2011), the USA (MacLennan et al. 2002), Australia (MacLennan et al. 1996), Morocco (Touiti et. al. 2020).

However, we did not find any correlation between this socioeconomic factor and desire of Ukrainians to consume/not consume HPs. Therefore results of our thesis are more comparable with those in Suriname (Andel & Carvalheiro 2013), Ghana (Jibril et. al. 2019), East Timor (Grace et. al. 2020), South Africa (Hughes et. al. 2015), Sierra Leone (James et. al. 2018), where occupation/employment status does not have any significant influence on HPs' consuming as well.

Research in Uganda (Kaadaaga et. al. 2014), Malaysia (Aziz & Tey 2008), Suriname (Andel & Carvalheiro 2013), Australia (MacLennan et. al. 1996) define marital status as important HPs' consumption predictor.

Results of our study did not confirm that. They are more similar to results in the South Africa (Hughes et. al. 2015), Sierra Leone (James et. al. 2018), Morocco (Touiti et. al. 2020), where marital status does not play any role in predicting consumption of HPs.

It was proved by scientific results, for instance, in Indonesia (Rahayu et. al. 2020) and the Czech Republic (Knotek et al. 2012), that there is a difference regarding HPs' consumption between rural and urban population. We did not find any significant difference between them. Therefore our results are more familiar with findings in Suriname (Andel and Carvalheiro 2013), East Timor (Grace et. al. 2020), South Africa (Hughes et. al. 2015) and Morocco (Touiti et. al. 2020).

Income belongs to one of the most popular factors, which influence consumption of HPs worldwide. It is significant in Malaysia (Aziz & Tey 2008), Uganda (Kaadaaga et. al. 2014), Australia (MacLennan et. al. 1996), the USA (Eisenberg et. al. 1993; MacLennan et. al. 2002), Nigeria (Ghazali et. al. 2019), Morocco (Touiti et. al. 2020), Sierra Leone (James et. al. 2018), Lebanon (Ghazeeri et. al. 2012). According to our findings, income does not predict consumption of HPs in Ukraine. Similar results were found in Suriname (Andel and Carvalheiro 2013), Ghana (Jibril et. al. 2019), East Timor (Grace et. al. 2020) and South Africa (Hughes et. al. 2015).

It has been revealed, that Ukrainian consumers do not agree, that HPs' consumption somehow depends on seasonality. That contrasts to results in Jordan, where approximately one third of respondents prefer to use this kind of medication only during certain season (El-Dahiyat 2020).

## 7. Limitation of the Research

The study is not without limitations. Among its main limits, we could mention:

The fieldwork has been carried out during August-September, 2019. For many Ukrainians it is the time for active work on their home gardens and many of them, therefore, did not participate our survey. Besides that, results could be different if we ask people about specificity of herbal products usage during season of respiratory diseases (winter).

Despite the fact, that absolute majority of our respondents were female (87.6%), a very few questionnaires with data about herbal products usage in terms of “women” illnesses treatment were received. We are linking this with gender of the researcher and think, that female respondents were too shy to share this personal information with man.

According to official statistics, there are 52% of female and 48% of male live in Khmel'nitska oblast in Ukraine (Statistical service office 2019). However, participants of our survey were 87.6% of female. This gender imbalance could cause problems with generalization of research data.

According to sample size calculator Raosoft (2019), the sample size should be 385 respondents. After finishing the fieldwork we have realized, that just 331 questionnaires were valid to analyze.

We could not exclude, that inhabitants of other Ukrainian region could have preferences in usage other herbal products.

Due to these limits, any generalization of the results may lead to a misinterpretation. Further surveys targeting the entire population would be needed.

## 8. Conclusion

Consumption of herbal products in Ukraine is very important, has long history and rich traditions. During XX century, its industry received a big support from government, which was manifested in many scientific researches of healing effects of herbal products and its active usage as official medications. Nowadays herbal products exist as medication and dietary supplements in Ukraine.

It has been found high level of familiarity with herbal products and high level of their usage by the respondents of our survey. The most popular herbal products were *Peppermint*, *Lemon balm*, *Pot marigold*, *Camomile* and *St. John's wort*. The main reported reasons for using herbal products were gastrointestinal, immune, stress, respiratory system sicknesses as well as skin, hair and nails problems.

In general, respondents consider herbal products as effective, cheap and safe medications, but agree that their healing effect could be higher in case of combination with conventional drugs. Majority of participants of survey do not have any seasonality preferences in consumption of herbal products. They prefer to buy them in pharmacies in form of raw herbs, but quite often gather these herbs themselves or by them at open-air markets. The main source of information about herbal products is family. Among all tested socioeconomic factors, just gender has influence on respondents' consumption of herbal products. It was confirmed that females are more likely use them in comparison to males.

Great confidence of Ukrainians in safety and effectiveness of herbal products together with its relatively low prices in Ukraine, gaps in medical legislation and lack of herbal products' prescriptions by comparison with previous years could be very dangerous for health of citizens due to possible adverse effects from herbal products' self-medication.

Therefore, it is very important for the Health Ministry of Ukraine to pay more attention to the problem to prevent further health complication of Ukrainians, caused by non-prescribed herbal products.

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