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Study on the current use of four important medicinal plants of Lamiaceae in Bulgaria

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Abstract: *In contemporary society various demographic factors lead to changes of people habits to use medicinal plants. A matter of interest is to establish how specific demographic features of people influence the use of herbs. The present survey aimed at determining the current trends regarding the use of four valuable medicinal Lamiaceae species in Bulgaria: thyme, mint, lemon balm and oregano. In the survey, 220 people were interviewed. Demographic profiles of the respondents were evaluated. Then the participants were questioned for the following item: "Do you use any of these herbs: thyme, mint, lemon balm and oregano." In order to disclose correlations between demographic features of the participants and their answers cross-relationships were analyzed. The majority of respondents reported to use these plants. Mint and thyme were more commonly used herbs. We identified that age of respondents had sufficient influence on the answer to the questionary. Level of education and living regions had moderate impact on the use of relatively lesser utilized herbs – oregano and lemon balm. The analysis showed the persistence of traditional knowledge for these plants. At the same time, the results revealed better knowledge on medicinal plants in groups of better educated people and in urban population.*

Keywords*: ethnobotanical survey, Lamiaceae, thyme, mint, lemon balm, oregano, folk medicine*

Introduction

Ethnobotany has been defined as the study of the indigenous knowledge on diversity and use of native plants [1]. Modern ethnobotany is a multidisciplinary science area focused on the plant utilization in local ethnopharmacy and ethnomedicine [2]. In contemporary society various factors (globalization, urbanization, migration, a lack of interest in young people, free access to information *etc*.) lead to changes of people habits to use medicinal plants. The loss of traditional knowledge on

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medicinal plants is widely reported globally in recent years [3, 4]. Therefore, a matter of interest from an ethnobotanical viewpoint is to establish how specific demographic features of people influence the use of herbs [5, 6]. Bulgarians have a traditions in using herbal medicines to treat common diseases from ancient times [7], but research on the factors associated with herbal medicinal use in Bulgaria nowadays is limited.

Lamiaceae is one of the major sources of medicinal plants all over the world. Because of this the species of this family have been studied in various ethnobotanical surveys [8, 9]. The members of this family are widely used also in Bulgarian folk medicine [4, 10]. Among the most popular plants from the Lamiaceae family are *species* thyme, mint, lemon balm and oregano. These plants have been used as spices and protective and curative remedy for many ailments for centuries [11, 12, 13, 14]. Contemporary scientific research confirmed their valuable medicinal properties [13, 14, 15, 16, 17, 18].

The present survey aimed at determining the current trends regarding the use of four valuable medicinal *Lamiaceae species* in Bulgaria: thyme, mint, lemon balm and oregano.

Materials and methods

The survey has been conducted in different regions of Bulgaria *during April-September* 2013. The survey was carried out by using the face-to-face interview technique as described in similar studies [5, 6]. The interviewed people were chosen randomly. The researchers and Ethnobotany Club student members (Department of Biology, University of Shumen, Bulgaria) carried out the survey.

The demographic features of the people who accepted to participate in the interview were determined. Then the participants were questioned for the following item: "Do you use any of these herbs: thyme, mint, lemon balm and oregano".

Descriptive statistic procedures like percentages and frequency distributions are used for analyzing the data. Pearson correlation coefficient was calculated to measure the correlation between items questioned and demographic variables. The magnitude of the correlation coefficient that determines the strength of the correlation was estimated according to [19]: $r = 0$ lack of correlction, $0 < r \leq 0.3$ weak correlation, $0.3 < r \leq 0.5$ moderate correlation, $0.5 < r \leq 0.7$ significant correlation, $0.7 < r \leq 0.9$ strong correlation, $0.9 < r \leq 1$ very strong correlation, $r = 1$ means functional dependence. The chi-square tests allow us to determine if the dependence between the corresponding variables is statistically significant and $P < 0.05$ was evaluated as significant.

Results and discussion

Conducting interviews with representatives of the local population is the primary method of data collection in ethnobotany [5, 6, 20, 21]. In the present survey 220 people were interviewed. The demographic features of the respondents are summarized in Figure 1.
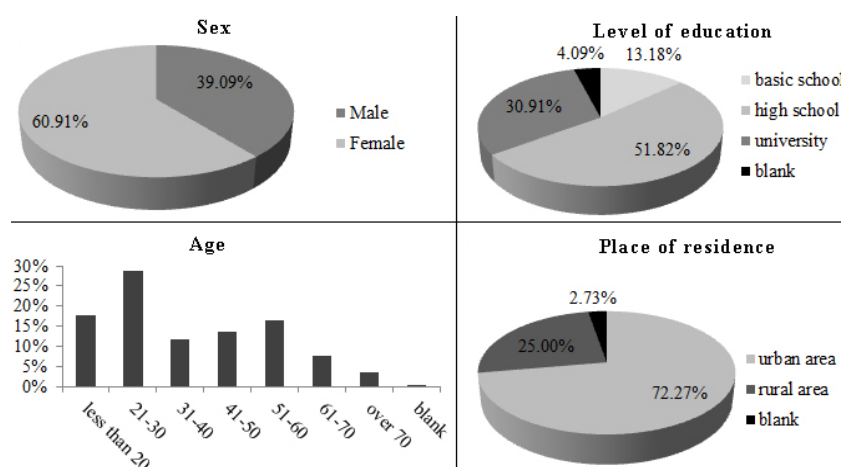
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Figure 1. Demographic features of the informants (n = 220).

In Table 1 the distribution of the participants with respect to their answers to the inquiry "Do you use any of these herbs: thyme, mint, lemon balm and oregano" is presented. As can be seen, the majority of respondents use mint (83.18%) and thyme (75.91%). About half of the respondents use lemon balm (55.45%) and oregano (50.45%). In Bulgaria herbal medicines have been utilized since centuries [7]. Results of present study show that the local traditional use of herbs persists nowadays. Several recent studies also highlighted that knowledge about the use of herbs persists in many places in Europe [22].

Table 1. Responses of the participants (n = 220) to the inquiry.

Do you use any of these herbs:	Responses	Number (%)
Thyme	yes	167 (75.91)
	no	51 (23.18)
Mint	yes	183 (83.18)
	no	35 (15.91)
Lemon balm	yes	122 (55.45)
	no	96 (43.64)
Oregano	yes	111 (50.45)
	no	107 (48.64)

The percent differs from 100% if some of respondents gave no answer.

Further we analyzed cross-relationships between demographic features of participants and responses to the inquiry. In order to determine the correlation between item questioned and demographic variables standardized Pearson correlation coefficient was calculated. The analysis shows that age factor significantly influenced the questioned item (Table 2). The majority of respondents using four herbs belong to the age group of 61 to70 years and/or the group over 70. This result is probably due to the experience of the respondents from these age groups in the use of medicinal plants. A lot of studies underlined that the age is an important factor influencing the opinion of people on utilization of herbal medicines [5, 23, 24, 25].

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Analysis showed a moderate influence of the level of education on the responses about the use of thyme, lemon balm and oregano and little impact on the use of mint (Table 3). The largest proportion of respondents consuming lemon balm and oregano are university graduates, respectively 66.18% and 70.59%. Interestingly, these two plants are relatively less known (Table 1). The proportion of people reported to use thyme with primary and higher education is almost the same – about 85.00%. Similarly, the level of education doesn`t influence the use of mint.

Table 2. Relationship between the plants' uses and the age of respondents.

Do you use any of these herbs:	Age of respondents	Responses	
		Yes, n (%)	No, n (%)
Thyme*[d]	> 20 (n = 39)	28 (71.79)	11 (28.21)
	21 - 30 (n = 63)	46 (73.02)	17 (26.98)
	31 - 40 (n = 26)	21(80.77)	5 (19.23)
	41 - 50 (n = 30)	22 (73.33)	7 (23.33)
	51 - 60 (n = 36)	30 (83.33)	6 (16.67)
	61 - 70 (n = 17)	15 (88.24)	2 (11.76)
	< 70 г. (n = 8)	5 (62.50)	3 (37.50)
Mint*[c]	> 20 (n = 39)	32 (82.05)	7 (17.95)
	21 - 30 (n = 63)	51 (80.95)	12 (19.05)
	31 - 40 (n = 26)	22 (84.62)	4 (15.38)
	41 - 50 (n = 30)	21 (70.00)	8 (26.67)
	51 - 60 (n = 36)	32 (88.89)	4 (11.11)
	61 - 70 (n = 17)	17 (100.00)	0 (00.00)
	< 70 г. (n = 8)	8 (100.00)	0 (00.00)
Lemon balm*[d]	> 20 (n = 39)	15 (38.46)	24 (61.54)
	21 - 30 (n = 63)	26 (41.27)	37 (58.73)
	31 - 40 (n = 26)	16 (61.54)	10 (38.46)
	41 - 50 (n = 30)	19 (63.33)	10 (33.33)
	51 - 60 (n = 36)	25 (69.44)	11 (30.56)
	61 - 70 (n = 17)	15 (88.24)	2 (11.76)
	< 70 г. (n = 8)	6 (75.00)	2 (25.00)
Oregano* [d]	> 20 (n = 39)	13 (33.33)	26 (66.67)
	21 - 30 (n = 63)	27 (42.86)	36 (57.14)
	31 - 40 (n = 26)	16 (61.54)	10 (38.46)
	41 - 50 (n = 30)	15 (50.00)	14 (46.67)
	51 - 60 (n = 36)	24 (66.67)	12 (33.33)
	61 - 70 (n = 17)	9 (52.94)	8 (47.06)

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| | < 70 г. (n = 8) | 7 (87.50) | 1 (12.50) |

n – number; * – $P < 0.05$; [c] – significant, [d] – strong correlation. The percent differs from 100% if some of respondents gave no answer.

Table 3. Relationship between the plants' uses and the level of education of respondents.

Do you use any of these herbs:	Level of education	Responses	
		Yes, n (%)	No, n (%)
Thyme*[b]	Basic school (n = 29)	25 (86.21)	4 (13.79)
	High school (n = 114)	79 (69.30)	35 (30.70)
	University (n = 68)	58 (85.29)	9 (13.24)
Mint*[a]	Basic school (n = 29)	24 (82.76)	5 (17.24)
	High school (n = 114)	96 (84.21)	18 (15.79)
	University (n = 68)	57 (83.82)	10 (14.71)
Lemon balm*[b]	Basic school (n = 29)	13 (44.83)	16 (55.17)
	High school (n = 114)	58 (50.88)	56 (49.12)
	University (n = 68)	45 (66.18)	22 (32.35)
Oregano*[b]	Basic school (n = 29)	12 (41.38)	17 (58.62)
	High school (n = 114)	46 (40.35)	68 (59.65)
	University (n = 68)	48 (70.59)	19 (27.94)

n – number; * – $P < 0.05$; [a] – weak, [b] – moderate correlation. The percent differs from 100% if some of respondents gave no answer.

We identified that living at the urban or rural regions influence the use of four herbs (Table 4). Most of respondents reported to use mint are rural inhabitants. This observation showed existence of traditional knowledge concerning this herb. On the contrary, most of respondents reported to use thyme, lemon balm and oregano belong to urban population. This might be due to growing popularity of these herbs distributed by mass media and internet, to which people living in villages do not always have access.

Table 4. Relationship between the plants' uses and the place that have been inhabited longer by the respondents.

Do you use any of these herbs:	Place where live longer	Responses	
		Yes, n (%)	No, n (%)
Thyme*[b]	Urban area (n = 159)	124 (77.99)	34 (21.38)
	Rural area (n = 55)	40 (72.73)	15 (27.27)
Mint*[b]	Urban area (n = 159)	133 (83.65)	25 (15.72)
	Rural area (n = 55)	47 (85.45)	8 (14.55)

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Lemon balm* [b]	Urban area (n = 159)	91 (57.23)	67 (42.14)
	Rural area (n = 55)	28 (50.91)	27 (49.09)
Oregano* [b]	Urban area (n = 159)	88 (55.35)	70 (44.03)
	Rural area (n = 55)	20 (36.36)	35 (63.64)

n – number; * – P < 0.05; [b] – moderate correlation. The percent differs from 100% if some of respondents gave no answer.

Sex of respondents exerts a little impact on the answers to the inquiry. (Таблица 5). The percentage of women who reported to use thyme, mint and lemon balm was higher. A popular assumption is that women usually take better care of their health than men. The results of present survey confirmed this observation [4]. It must be noticed that oregano – the least used herb (Table 1) is more common to male respondents. This data might be explained by observation that women usually are bearer of traditional knowledge [26]. Recently oregano valuable properties have been widely studied and results are presented in mass media. It might be speculated, that men preferred to access information by this way.

Table 5. Relationship between the plants' uses and the sex of respondents.

Do you use any of these herbs:	Sex of the respondents	Responses	
		Yes, n (%)	No, n (%)
Thyme [a]	Male (n = 86)	61 (70.93)	24 (27.91)
	Female (n = 134)	106 (76.10)	27 (20.15)
Mint [a]	Male (n = 86)	71 (78.53)	14 (20.59)
	Female (n = 134)	112 (82.18)	21 (16.36)
Lemon balm [a]	Male (n = 86)	43 (50.00)	42 (48.84)
	Female (n = 134)	79 (58.96)	54 (40.30)
Oregano [a]	Male (n = 86)	45 (52.33)	40 (46.51)
	Female (n = 134)	66 (49.25)	67 (50.00)

n – number; [a] – weak correlation. The percent differs from 100% if some of respondents gave no answer.

Conclusions

The results of present survey showed the persistence of traditional knowledge for selected plants: thyme, mint, lemon balm and oregano. Among the four herbs mint and thyme are more frequently used in Bulgaria. Lemon balm and oregano are used mostly by respondents with *better* education and by the urban population. The largest proportion of respondents who reported to use four herbs belongs to the age group over 60 years.

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