



Research paper

Satisfaction with and factors related to medicinal herb consumption in older Iranian adults



Mahdiah Sabery, Mohsen Adib-Hajbaghery*, Saeedeh Rafiee

Trauma Nursing Research Center, Kashan University of Medical Sciences, Kashan, Iran, 8715988111

ARTICLE INFO

Keywords:

Complementary medicine
Elderly
Medicinal herbs
Satisfaction
Cross-sectional
Descriptive study

ABSTRACT

Introduction: Several factors may have led to herbal medicines consumption, especially in older adults. However, the frequency of satisfaction with, and factors related to the use of medicinal herbs in older adults are not clear. The present study explored the satisfaction with and factors pertaining to medicinal herb use in a sample of Iranian older adults.

Methods: This cross-sectional study was conducted on 770 old citizens of Kashan, Iran in 2016. A random cluster sampling method was used. The data collection instrument was developed by the researchers and contained questions on demographic variables, the history of known chronic disorders, history of medicinal herb use, the reason for choosing medicinal herbs, subjects' knowledge on medicinal herbs, and their satisfaction with the medicinal herbs used. Chi-square and Fisher's exact tests and binary logistic regression were used for data analysis.

Results: Approximately, 67.8% of the older adults (72.8% females and 62.4% males) used medicinal herbs. Most of the subjects (60%) were satisfied with their consumption of medicinal herbs. A statistically significant association was found between the use of medicinal herbs and having disorders such as cancer ($p = 0.006$) and hyperlipidemia ($p = 0.006$). Most of the older adults (48.57%) were highly likely to believe in the efficacy of herbs.

Conclusions: Medicinal herb consumption was prevalent among older adults -especially among those with chronic conditions- over half were satisfied with the use of herbs. It is necessary to develop training programs on the safe use of herbs for the community and especially for older adults.

1. Introduction

Although recent advances in modern medicines have greatly improved the treatment and management of diseases, a large part of the population still depends on herbal medicines as the preferred form of health care. A recent study reported that more than a third of older adults in Germany used medicinal herbs [1]. However, the proportion of herbal medicines and medicinal herbs used in the developing countries is reported to be about 80% [2,3]. Medicinal herbs are also used rather extensively in Iran and the most recent proportion of consumption is reported to be 69.2% [4]. The use of medicinal herbs in Iran dates back to thousands of years ago. Iranians have been the pioneers of phytomedicine and herbal drugs [5]. The senescent population is increasing around the globe and Iran is no exception [6]. It is predicted that the elderly will account for one-third of the Iranian population by 2050 [5]. Senescence is associated with many chronic disorders [7]; as a result, many elderly have to take numerous chemical drugs

simultaneously [5,8,9]. Meanwhile, many older adults are not satisfied with the outcomes of ordinary treatments driving them to self-treatment with medicinal herbs [10,11]. However, the degree of satisfaction of this group with the consumption of medicinal herbs is not clear yet. Several studies have focused on medicinal herbs, most have investigated the efficacy of certain herbs in treating specific diseases such as diabetes mellitus [3,12–14], hypertension [15–19], and cancer [20,21]. Nonetheless, little is known about the level of satisfaction with medicinal herbs, especially their use by older adults. A study by Azizi et al. reported a moderate satisfaction with medicinal herbs [22]. In another study, 94% of those who used complementary medicine (including medicinal herbs) reported being satisfied [23]. Studies have reported disparate and even contradictory results about factors related to the use of medicinal herbs. For instance, some of the studies have reported that women [22], and people of younger ages use herbs more than men and older adults [24]. However, some other studies have reported that people of older ages, and those who are married [25] used

* Corresponding author.

E-mail address: adib1344@yahoo.com (M. Adib-Hajbaghery).<https://doi.org/10.1016/j.eujim.2018.12.005>

Received 1 October 2018; Received in revised form 10 December 2018; Accepted 18 December 2018

1876-3820/ © 2018 Elsevier GmbH. All rights reserved.

herbs more than people who were single. A number of studies also reported that availability of herbs [26], and people's belief in the safety of herbs and their low cost [27] are among the most important reasons for herb use. These studies have been conducted on the general population and not restricted to older adults. Given the vulnerability of older adults and their high inclination to use medicinal herbs, investigating the factors affecting the use of these drugs seems necessary. Hence, the present study explored the factors pertaining to the use of medicinal herbs by older adults and the level of their satisfaction with such preparations.

2. Methods

This cross-sectional study was conducted on older citizens living in Kashan, Iran, in 2016. The inclusion criteria were: age of 60+ years, agreeing to participate, the ability to respond to questionnaire items, and lack of any self-reported cognitive disorders. The sample size was estimated to be 768 subjects using the parameters obtained from Akbari et al.'s study [28] ($P = 0.74$, $d = 0.05$, $\alpha = 0.01$) with a cluster sampling index of 1.5. However, we recruited 770 subjects into the study. Various healthcare facilities provide primary health care services to the people of Kashan city. Health dossiers and lists of all families (including families having older adults) living in the area receiving healthcare are available at each center.

A random cluster sampling method was used in which the Kashan city was divided into five zones including center, north, south, west, and east. Since there were 14 healthcare facilities and 17 health bases in this city, two healthcare centers or health bases were randomly selected in each zone. The list of families with at least one older adult registered by each center was provided by the authorities and then the numbers of required subjects for each zone were estimated based on the study sample size and the numbers of elderly resided in each area. Considering the possibility of dropouts, five were added to the numbers needed in each area. Then, using an online random number generator (<https://www.random.org/integers/>), a random list of the needed numbers of the families having older adults was generated for each area and their addresses were extracted. The last five in each list were used to compensate dropouts if needed. The questionnaires were completed through individual interviews with the researcher in the subject's home. If a subject did not wish to participate, another subject from the end of the list replaced them. A total of 31 subjects from different areas decided not to take part in the study and were replaced with new ones from the end of the concerned lists (Fig. 1).

The data collection instrument was developed by the researchers through an extensive literature review. The content validity of the

instrument was established by 10 experts in the field and its reliability was measured using test-retest. The consistency coefficient was 0.95. The instrument consisted of 11 items on demographic variables (age, gender, marital status, living arrangement, number of children, occupation, insurance status, financial status, and education level), five items on the history of known chronic disorders, history of consumption of medicinal herbs, the reason for choosing medicinal herbs, the subjects' knowledge on medicinal herbs, the subjects belief in the effectiveness of herbs in treatment of diseases, and three items on general satisfaction with the use of medicinal herbs, specific herbs currently used, and satisfaction with the specific herb used. To answer the item "satisfaction with the use of various types of medicinal herbs", a 3-point Likert scale was used that included low, moderate, and high degrees.

2.1. Ethical considerations

The study proposal was approved by the Committee of Ethics in Human Research at Kashan University of Medical Sciences with code of ethics no.: IR.KAUMS.REC.1395.88. Informed written consent was obtained from each participant and the principles of information confidentiality and patient anonymity were observed. Research principles and procedures were fully explained to the subjects and they participated in the study voluntarily.

2.2. Data analysis

The collected data were imported to SPSS software version 13.0 (SPSS Inc., Chicago, IL, USA) and descriptive statistics (frequency, percentage, mean and standard deviation), Chi-square test, and Fisher's exact test were used to determine the factors contributing to the use of medicinal herbs. Moreover, binary logistic regression was used to determine the predictors of satisfaction with medicinal herb used. To this end, all variables were converted to dichotomous ones. Then, the general satisfaction with medicinal herb use (satisfied/dissatisfied) was considered as the dependent variable and then, using backward model, other variables such as age group (below and over 65 years), gender, education level (high literacy/low literacy), marital status (single/married), living arrangement (alone/not alone), insurance status (insured/not insured), financial status (sufficient/insufficient), and having a chronic condition (yes/no) were entered the model as covariates. P values of ≤ 0.05 were considered statistically significant. As all questionnaires were completed through individual interviews, no missing data occurred.

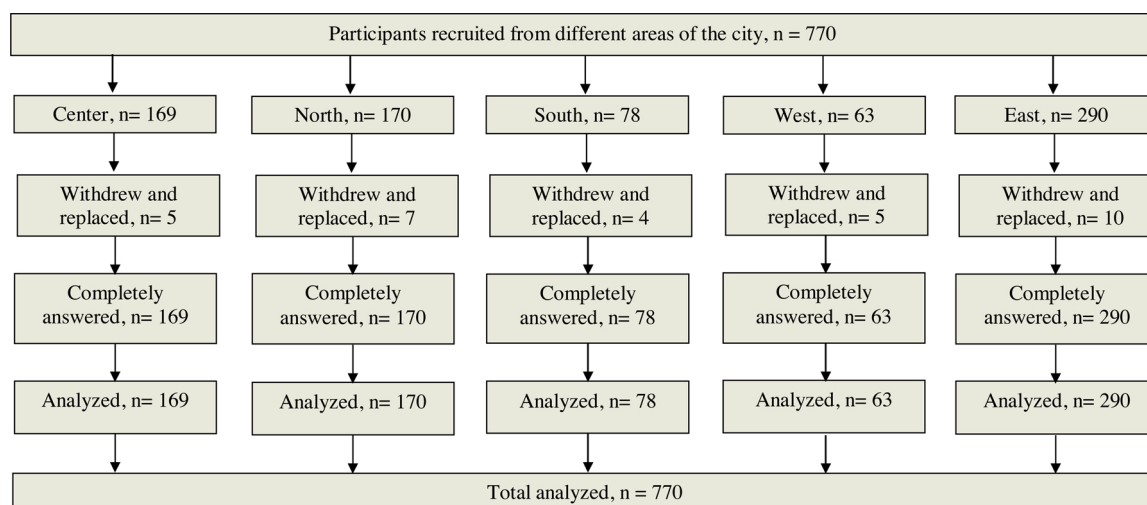


Fig. 1. The study flow diagram.

Table 1

Frequency distribution of the types of medicinal herbs used and the older adults' satisfaction with their use.

Medicinal Herbs	Satisfaction		
	Low, n (%)	Moderate, n (%)	High, n (%)
Violet	–	13 (25.49)	38 (74.50)
Orange blossoms	–	6 (26.08)	17 (73.90)
Borage	4 (2.81)	37 (26.05)	101 (71.11)
Valerian	2 (4.44)	11 (24.44)	32 (71.10)
Sour tea	1 (5.00)	5 (25.00)	14 (70.00)
Ginger	2 (1.36)	43 (29.45)	101 (69.17)
Thyme	1 (1.04)	30 (31.25)	65 (67.70)
Spearmint	5 (2.46)	69 (33.99)	129 (63.53)
Chicory	1 (1.09)	34 (37.36)	56 (61.53)
Spike lavender	3 (12.5)	7 (29.16)	14 (58.32)
Fumitory	–	6 (42.85)	8 (57.13)
Cinnamon	3 (2.54)	50 (42.37)	65 (55.07)
Fleawort	–	52 (46.84)	59 (53.14)
Jujube	4 (6.77)	25 (42.37)	30 (50.84)
Pussy willow	1 (1.28)	38 (48.71)	39 (47.99)
Hedge-mustard	2 (2.98)	33 (49.25)	32 (47.75)
Alhagi	2 (7.40)	13 (48.14)	12 (44.43)
Green tea	10 (11.49)	43 (49.42)	34 (39.03)
Cumin seed	1 (4.76)	13 (61.90)	7 (33.33)
Garlic	6 (21.42)	15 (53.57)	7 (24.99)
Common dill	2 (11.76)	11 (64.70)	4 (23.52)
Damascus rose	–	10 (83.33)	2 (16.66)
Fenugreek	2 (14.28)	10 (71.42)	2 (14.28)
Miscellaneous*	10 (6.06)	59 (45.69)	63 (47.72)

* Marshmallow, Alovera, Walnut skin, Small caltrops, Flax seed, Pennyroyal, Eucalyptus, Stinging nettle, Liquorice, Caraway, Fennel, Quince, Quince seeds, Currant, Eryngium, Manna, Sumac, a mixture of seven plants (including: dill, celery, Carum, Stinging nettle, Garlic, Olive leaves, Walnut leaves), a mixture of the four seeds (including: Alyssum, seed of basil, Quince seeds, Plantain).

3. Results

Over half of the participants were female (51.9%) and married (80.5%). The mean age of the participants was 68.59 ± 7.98 years. Also, 67.8% of the older adults (72.8% females and 62.4% males) took medicinal herbs at the time of the study. Of the 60% satisfied with their consumption of medicinal herbs, highest satisfaction was for violet (74%), orange blossom (73%), and borage (cowslip) (71%) (Table 1). Significant associations were found between the use of medicinal herbs and factors such as gender ($P = 0.003$), occupation ($P = 0.017$), having a chronic condition ($P = 0.007$), the level of belief in the efficacy of the herbs ($P = 0.001$), and the level of information on medicinal herbs ($P = 0.001$). However, no significant connection was found between the use of medicinal herbs and other variables (Table 2). The most frequent known chronic diseases among the elderly were hypertension (44.5%), diabetes (38.4%), arthritis (29.6%), cardiovascular diseases (27.1%), and hyperlipidemia (21.3%), respectively. A statistically significant association was found between the use of medicinal herbs and having cancer ($p = 0.006$) and hyperlipidemia ($p = 0.006$) (Table 3). However, no significant connection was found between having a chronic condition and satisfaction with medicinal herbs used ($P = 0.196$). Most of the older adults (48.57%) highly believed in the efficacy of herbs (Fig. 2) while 34.2% of them had moderate information on medicinal herbs (Fig. 3). The most important inducements for the subjects' inclination towards medicinal herbs were: the individual's previous experience or their friends' experience (46.3%), side effects of chemical drugs (12.3%), dissatisfaction with the current medicines (10.1%), and high costs of the current treatments (5.5%), respectively. Moreover, a number of the subjects used medicinal herbs due to a combination of factors (24.1%) or other reasons such as disease prevention or boosting their health (1.7%).

Binary logistic regression showed that among all variables entered

Table 2

Status of medicinal herb consumption in terms of demographic parameters.

Variables under study	Use of medicinal herbs		Pvalue
	Yes, n (%)	No, n (%)	
Mean age	68.14 ± 8.19	69.06 ± 9.51	0.198***
Age			0.588 [†]
60-80	478 (68.1)	224 (31.9)	
81 +	44 (64.7)	24 (35.3)	
Gender			0.003 [†]
Male	231 (62.4)	139 (37.6)	
Female	291 (72.8)	109 (27.2)	
Education level			0.251**
Illiterate	237 (64.4)	131 (35.6)	
Primary school	225 (71.7)	89 (28.3)	
Secondary and high school	54 (68.4)	25 (31.6)	
Academic	6 (66.6)	3 (33.3)	
Marital status			0.470**
Single	2 (50.0)	2 (50.0)	
Married	416 (67.1)	204 (32.9)	
Widowed and divorced	104 (71.2)	42 (28.8)	
Living arrangement			0.654 [†]
Living alone	59 (68.6)	27 (31.4)	
Living with spouse or family	415 (67.2)	203 (32.8)	
Living with children	48 (72.7)	18 (27.3)	
Number of children			0.250**
0-3	102 (69.9)	44 (30.1)	
4-6	313 (69.1)	140 (30.9)	
6 +	107 (62.6)	64 (37.4)	
Occupation			0.012**
Retired	169 (62.4)	102 (37.6)	
Housewives	271 (73.4)	98 (26.6)	
Self-employed	76 (62.3)	46 (3.7)	
Other jobs	6 (75.0)	2 (25.0)	
Insurance status			0.273 [†]
Insured	492 (68.3)	228 (31.7)	
Not insured	30 (60.0)	20 (40.0)	
Financial status			0.504**
Favorable	195 (65.7)	102 (34.3)	
Moderate	233 (70.0)	100 (30.0)	
Unfavorable	94 (67.1)	46 (32.9)	
Having a chronic condition			0.007**
Yes	448 (69.6)	196 (30.4)	
No	72 (57.1)	54 (42.9)	

* Fisher's exact test.

** Chi-square test.

*** Mann Whitney.

the model, only the subjects' belief in the effectiveness of medicinal herbs could predict 18% of the variance of satisfaction with medicinal herbs used ($OR = 1.64$; 95% CI: 0.61, 2.12, $r^2 = 0.15$).

4. Discussion

In this study, 67.8% of the participants used medicinal herbs. Our findings demonstrated that most of the subjects were satisfied with consuming medicinal herbs. This is consistent with the results of a study by Brunt et al. [29]. Considering the chronic nature of many physical problems in older adults and also due to side effects of synthetic drugs and treatment methods of modern medicine, many older adults have adhered to the medicinal herbs believing that these drugs are better than the modern medicines. This may explain the high popularity and satisfaction with medicinal herbs. High costs of chemical drugs can be another reason for the older adults' inclination toward traditional medicines.

There was a significant relationship between the older adults' gender and use of medicinal herbs, so that the use of medicinal herbs was significantly higher among the females than the males. Results of a number of earlier studies [22,30] are consistent with this finding. Nevertheless, Akbari et al. [28] and Moradi et al. [25] found no significant connection between gender and herb use. The higher levels of

Table 3
Status of herb consumption in older adults with a known chronic disease.

Type of disease		Herb consumption		P value
		Yes	No	
Diabetes	Yes	212 (71.6)	84 (28.4)	0.086*
	No	310 (65.4)	164 (34.6)	
Hypertension	Yes	235 (68.5)	108 (31.5)	0.760*
	No	287 (67.22)	140 (32.8)	
Cardiovascular	Yes	138 (66.0)	71 (34.0)	0.581*
	No	384 (68.4)	177 (31.6)	
Hyperlipidemia	Yes	134 (81.7)	30 (18.3)	< 0.001*
	No	388 (64.0)	218 (36.0)	
Pulmonary	Yes	29 (69.0)	13 (31.0)	0.993*
	No	493 (67.7)	235 (32.3)	
Renal	Yes	21 (75.0)	7 (25.0)	0.537**
	No	501 (67.8)	241 (32.5)	
Hepatic	Yes	6 (46.2)	7 (53.8)	0.131**
	No	516 (68.2)	241 (31.8)	
Digestive	Yes	41 (70.7)	17 (29.3)	0.730*
	No	481 (67.6)	231 (32.4)	
Visual	Yes	83 (65.4)	44 (34.6)	0.630*
	No	439 (68.3)	204 (31.7)	
Auditory	Yes	10 (76.9)	3 (23.1)	0.565**
	No	512 (67.6)	245 (32.4)	
Arthritis	Yes	165 (72.4)	63 (27.4)	0.093*
	No	357 (65.5)	185 (34.5)	
Cancer	Yes	4 (30.8)	9 (69.2)	0.006**
	No	518 (68.4)	239 (31.68)	
Insomnia	Yes	202 (70.4)	85 (29.6)	0.269*
	No	320 (66.3)	163 (33.7)	

* Chi-square test.

** Fisher's exact test.

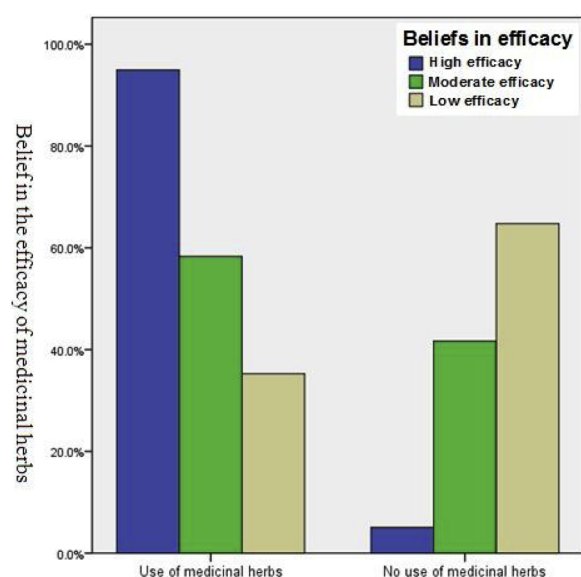


Fig. 2. Percents of older adults' beliefs in high, moderate and low efficacy of medicinal herbs.

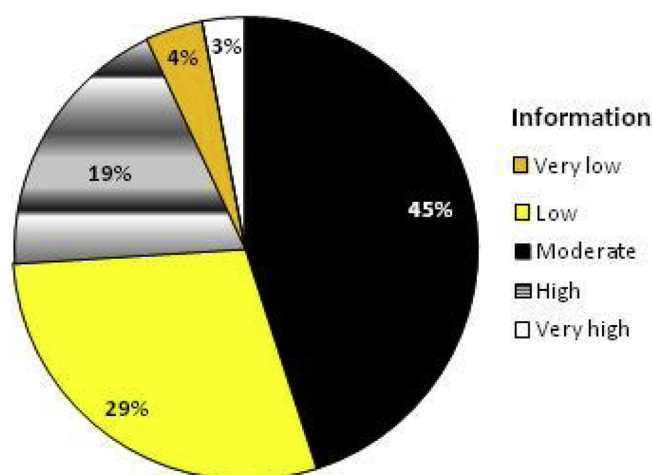


Fig. 3. Percents of older adults' very low, low, moderate, high and very high levels of information on medicinal herbs.

herb use among women may be due to women's greater concern with their own health or their poorer financial status [31]. Yet, differences in results may be attributed to differences in sample size and distribution and also to cultural differences among the participants in different studies.

The present study also found no significant relationship between age and herb use. The results of the studies by Akbari et al. [28], and Azizi et al. [22] in Iran and also by Badreldin et al. [32] in Sudan were consistent with our findings. Contrary to these findings, Moradi et al.'s study in Tehran, Iran, revealed that the use of medicinal herbs was significantly lower in the 15–40 years age group [25]. Lafferty et al. reported that younger and middle-aged individuals used complementary medicine methods more frequently [24]. Of course, it should be noted that a range of methods of complementary medicine has been addressed in all of these studies. Moreover, there was no significant connection between marital status and number of children and herb use. In other words, most elderly used medicinal herbs regardless of their marital status. Furthermore, the studies by Singh et al. [33], Kim et al. [34], and Honda and Jacobson [35] found no significant association between marital status and the use of complementary medicine. Conversely, Moradi et al. reported that the single individuals used less medicinal herbs compared to the married ones. This may be due to the greater number of women and the married in this study [25].

Moreover, a significant relationship was found between occupation and herb use in the present study. The highest level of herb consumption was found among the housewives while the studies by Akbari et al. [28], and Moradi et al. [25], found no association between occupation and herb use. This finding may be attributed to the greater number of women in the present study since housekeeping accounted for the most prevalent occupational status. So, this association has turned significant due to the high number of females in our study. Our study found no significant association between insurance status and herb use. This is consistent with the results obtained by Moradi et al. [25] and Ni et al. [36]. However, the study by Lafferty indicated an association between type of insurance and use of complementary medicine so that persons with PPO insurance (Preferred Provider Organizations) used complementary medicine more frequently compared to those with HMP insurance (Health Maintenance Organizations) [24]. The lack of association between insurance status and herb use in Iran may be explained by the lack of insurance coverage for phytomedicine services. Hence, both persons with insurance and those without insurance used the medicinal herbs relatively in the same manner.

The present study further revealed no significant association between financial status and the use of medicinal herbs. This finding

suggests that, regardless of financial status, the elderly show a high tendency for herb use. This may be attributed to individuals' cultural beliefs and backgrounds. Moreover, there was a significant relationship between the history of chronic physical disorders and herb use so that herb use was higher among patients with cancer and hyperlipidemia. Yet, the use of medicinal herbs was higher among the stroke victims in the United States of America [37], diabetics in Sudan [32], and pregnant women in Ethiopia [26]. Our finding might be attributed to the long course of treatment in patients with cancer and hyperlipidemia and their disappointment with the current therapies. This may probably drive the older adults to use medicinal herbs.

The current study also found a significant connection between the older adults' belief in the efficacy of medicinal herbs and their level of information on such herbs. The findings of the study by Rashidi et al. [38] were consistent with these results. The older adults' awareness of and familiarity with medicinal herbs and their belief in the efficacy and efficiency of these herbs as a result of the previous generations' experiences increase their inclination to such remedies.

As mentioned above, most of the subjects who used medicinal herbs have expressed that they are satisfied with medicinal herbs. However, in binary logistic regression, only their belief in the effectiveness of medicinal herbs could predict 18% of the variance of satisfaction with medicinal herb use. This finding may imply that the older adults' satisfaction with medicinal herbs is mostly influenced by their prior beliefs about the effectiveness of these herbs, not by the true effects of the herbs used. This is an important finding that must be noticed by the health care authorities and enforce them to design strategies to promote the safe and proper use of medicinal herbs. Physicians and nurses should also question all older adults, especially those with chronic conditions, about the use of herbs in all visits.

Although we examined some of the contributing factors of medicinal herb use and satisfaction in this cross-sectional study, the exact causal connections cannot be examined in this type of studies. The present study was conducted in Kashan city and only among older adults with health records in health care centers. Therefore, the results might not be fully generalized to all older adults. Thus, multicenter national and international studies may be helpful in providing a better understanding of the factors affecting medicinal herb use by older adults. Also some of the questions in the study instrument asked the participants about their history. Responses to such questions might be influenced by their recalls at the moment of responding. Moreover, qualitative and ethnographic studies are recommended to investigate the older adults' real experiences of medicinal herbs use.

4.1. Conclusion

Our findings demonstrated that medicinal herb use was prevalent among older adults and most of them were satisfied with these preparations. Given the high level of the participants' satisfaction with these herbs, the need is greatly felt to plan comprehensive programs for training the older adults in the community on the safe use of herbs, and to train knowledgeable, and competent staff in this field to provide phytomedicine and traditional medicine services to the users and especially older adults. Our findings further suggested significant relationships between "herb use" and variables such as gender, occupation, belief in the efficacy of medicinal herbs, the level of knowledge on medicinal herbs, and having hyperlipidemia, and cancer. These results sound the alarm for the authorities of the healthcare system. Considering the role of women in forming the treatment-seeking behaviors in families, the increasing use of medicinal herbs, and the public belief in the efficacy and complication-free nature of such herbs, it is mandatory to develop programs for educating women and older adults about the safe and efficacious use of medicinal herbs and herbal medicines.

Funding source

This study was founded by the Research Council of the Kashan University of Medical Sciences which financially supported this study. The grant number is: IR.KAUMS.REC.1395.88.

Conflict of interest

None.

Acknowledgements

We would like to profusely thank all the study participants who participated in this study.

We also hereby appreciate the authorities in the health care centers who cooperated with the research team.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.eujim.2018.12.005>.

References

- [1] K. Schnabel, S. Binting, C.M. Witt, M. Teut, Use of complementary and alternative medicine by older adults – a cross-sectional survey, *BMC Geriatr.* 14 (2014) 38, <https://doi.org/10.1186/1471-2318-14-38>.
- [2] I. Raskin, D.M. Ribnick, S. Komarnitsky, et al., Plants and human health in the twenty-first century, *Trends Biotechnol.* 20 (12) (2002) 522–531 PMID: 12443874.
- [3] J. Mwangi, L. Gitongam, Perceptions and use of herbal remedies among patients with diabetes mellitus in Murang'a North District, Kenya, *OJCD* 4 (03) (2014) 152, <https://doi.org/10.4236/ojcd.2014.43024>.
- [4] K. Anbari, K. Ghanadi, Use of complementary and alternative medicine methods and its related factors in persons referred to health centers in Khorramabad, *J. Complement Med.* 4 (4) (2015) 987–999.
- [5] M. Adib-Hajbaghery, H. Akbari, The severity of old age disability and its related factors, *FEYZ* 13 (3) (2009) 225–234.
- [6] M. Noroozian, The elderly population in Iran: an ever growing concern in the health system, *Iran. J. Psychiatry Behav. Sci.* 6 (2) (2012) 1–6 PMID: PMC3940007.
- [7] M. Adib-Hajbaghery, S. Rafiee, Medicinal plants use by elderly people in Kashan, Iran, *Nurs. Midwifery Stud.* 7 (2) (2018) 67–73, <https://doi.org/10.4103/nms.nms.109.17>.
- [8] R.A. Heuberger, K. Caudell, Polypharmacy and nutritional status in older adults, *Drugs Aging* 28 (4) (2011) 315–323, <https://doi.org/10.2165/11587670-000000000-00000>.
- [9] C.D. Venturini, P. Engroff, L.S. Ely, L.Fd.A. Zago, G. Schroeter, I. Gomes, et al., Gender differences, polypharmacy, and potential pharmacological interactions in the elderly, *Clinics (Sao Paulo)* 66 (11) (2011) 1867–1872 PMID: PMC3203957.
- [10] M. Adib-Hajbaghery, M. Hoseinian, Knowledge, attitude and practice toward complementary and traditional medicine among Kashan health care staff, 2012, *Complement. Ther. Med.* 22 (1) (2014) 126–132, <https://doi.org/10.1016/j.ctim.2013.11.009>.
- [11] S.A. Quandt, H. Chen, J.G. Grzywacz, R.A. Bell, W. Lang, T.A. Arcury, Use of complementary and alternative medicine by persons with arthritis: results of the National Health Interview Survey, *Arthritis Rheum.* 53 (5) (2005) 748–755, <https://doi.org/10.1002/art.21443>.
- [12] S. Ceylan, Ö. Azal, A. Taşlipinar, T. Türker, C.H. Açıkel, M. Gülec, Complementary and alternative medicine use among Turkish diabetes patients, *Complement. Ther. Med.* 17 (2) (2009) 78–83, <https://doi.org/10.1016/j.ctim.2008.07.003>.
- [13] S. Otoom, S. Al-Safi, Z. Kerem, A. Alkofahi, The use of medicinal herbs by diabetic Jordanian patients, *J. Herb. Pharmacother.* 6 (2) (2006) 31–41 PMID: 17182483.
- [14] M. Wazaify, F.U. Afifi, M. El-Khateeb, K. Ajlouni, Complementary and alternative medicine use among Jordanian patients with diabetes, *Complement. Ther. Clin. Pract.* 17 (2) (2011) 71–75, <https://doi.org/10.1016/j.ctcp.2011.02.002>.
- [15] B. Baharvand-Ahmadi, M. Asadi-Samani, A mini-review on the most important effective medicinal plants to treat hypertension in ethnobotanical evidence of Iran, *J. Nephropharmacol.* 6 (1) (2016) 3–8 PMID: PMC5295656.
- [16] S.D. Karou, T. Tchacondo, M.A. Djikpo Tchibozo, S. Abdoul-Rahaman, K. Anani, K. Koudouvo, et al., Ethnobotanical study of medicinal plants used in the management of diabetes mellitus and hypertension in the Central Region of Togo, *Pharm. Biol.* 49 (12) (2011) 1286–1297, <https://doi.org/10.3109/13880209.2011.621959>.
- [17] J. Mensah, R. Okoli, A. Turay, E. Ogie-Odia, Phytochemical analysis of medicinal plants used for the management of hypertension by Esan people of Edo state, Nigeria, *Ethnobotanical leaflets* 2009 (13) (2009) 1273–1287.
- [18] L.G. Ranilla, Y.I. Kwon, E. Apostolidis, K. Shetty, Phenolic compounds, antioxidant activity and in vitro inhibitory potential against key enzymes relevant for hyperglycemia and hypertension of commonly used medicinal plants, herbs and spices

- in Latin America, *Bioresour. Technol.* 101 (12) (2010) 4676–4689, <https://doi.org/10.1016/j.biortech.2010.01.093>.
- [19] A. Simaratanamongkol, K. Umehara, H. Noguchi, P. Panichayupakaranant, Identification of a new angiotensin-converting enzyme (ACE) inhibitor from Thai edible plants, *Food Chem.* 165 (2014) 92–97, <https://doi.org/10.1016/j.foodchem.2014.05.080>.
- [20] M. Greenwell, P. Rahman, Medicinal plants: their use in anticancer treatment, *Int. J. Pharm. Sci. Res.* 6 (10) (2015) 4103–4112, [https://doi.org/10.13040/IJPSR.0975-8232.6\(10\).4103-12](https://doi.org/10.13040/IJPSR.0975-8232.6(10).4103-12).
- [21] Z.Y. Wang, H.P. Liu, Y.C. Zhang, L.Q. Guo, Z.X. Li, X.F. Shi, Anticancer potential of *Euphorbia helioscopia* L. extracts against human cancer cells, *Anat. Rec. (Hoboken)* 295 (2) (2012) 223–233, <https://doi.org/10.1002/ar.21517>.
- [22] I. Azizi-Fini, M. Adib-Hajbaghery, Z. Gharehbohlou, Herbal medicine use among patients with type 2 diabetes in Kashan, Iran, 2015, *Eur. J. Integr. Med.* 8 (4) (2016) 570–575, <https://doi.org/10.1016/j.eujim.2016.04.003>.
- [23] M. Bahall, Prevalence, patterns, and perceived value of complementary and alternative medicine among cancer patients: a cross-sectional, descriptive study, *BMC Complement. Altern. Med.* 17 (345) (2017) 1–9, <https://doi.org/10.1186/s12906-017-1853-6>.
- [24] W.E. Lafferty, P.T. Tyree, A.S. Bellas, C.A. Watts, B.K. Lind, K.J. Sherman, et al., Insurance coverage and subsequent utilization of complementary and alternative medical (CAM) providers, *Am. J. Manag. Care* 12 (7) (2006) 397–404.
- [25] M. Moradi, M. Ramezani, H. Ansari, Factors influencing the use of herbal remedies/medicinal herbs among the general population in Tehran, Iran, *Payesh.* 7 (4) (2008) 313–320.
- [26] T. Laelago, T. Yohannes, F. Lemango, Prevalence of herbal medicine use and associated factors among pregnant women attending antenatal care at public health facilities in Hossana Town, Southern Ethiopia: facility based cross sectional study, *Arch. Public Health* 74 (7) (2016) 1–8, <https://doi.org/10.1186/s13690-016-0118-z>.
- [27] R. Bussmann, G. Malca-García, A. Glenn, D. Sharon, G. Chait, D. Díaz, et al., Minimum inhibitory concentrations of medicinal plants used in Northern Peru as antibacterial remedies, *J. Ethnopharmacol.* 132 (1) (2010) 101–108, <https://doi.org/10.1016/j.jep.2010.07.048>.
- [28] N. Akbari, N. Parvin, M. Sereshti, F. Safdari Dehcheshmeh, Study about different types of medicinal plants used by elderly people in Shahrekord city, Iran, 2009, *J. Shahrekord Univ. Med. Sci.* 12 (4) (2011) 26–32.
- [29] T.M. Brunt, M. van Genugten, K. Höner-Snoeken, M.J. Van de Velde, R.J. Niesink, Therapeutic satisfaction and subjective effects of different strains of pharmaceutical-grade cannabis, *J. Clin. Psychopharmacol.* 34 (3) (2014) 344–349 Doi: 0.1097/JCP.0000000000000129.
- [30] R. Heidarifar, N. Mehran, S. Momenian, S.M. Mousavi, M. Kouhbor, A. Hajialigol, A study of the status of use of drug plants and its related factors in Qom city, Iran, *Qom Univ. Med. Sci. J* 7 (4) (2013) 95–100.
- [31] Y. Zhang, M.J. Leach, H. Hall, T. Sundberg, L. Ward, D. Sibbritt, et al., Differences between male and female consumers of complementary and alternative medicine in a national US population: a secondary analysis of 2012 NHIS data, *Evid. Complement. Alternat. Med.* 2015 (2015) 1–10.
- [32] B.H. Ali, G. Blunden, M.O. Tanira, A. Nemmar, Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): a review of recent research, *Food Chem. Toxicol.* 46 (2) (2008) 409–420, <https://doi.org/10.1016/j.fct.2007.09.085>.
- [33] V. Singh, D.M. Raidoo, C.S. Harries, The prevalence, patterns of usage and people's attitude towards complementary and alternative medicine (CAM) among the Indian community in Chatsworth, South Africa, *BMC Complement. Altern. Med.* 4 (3) (2004) 1–7, <https://doi.org/10.1186/1472-6882-4-3>.
- [34] I.J. Kim, J.K. Kang, S.A. Lee, Factors contributing to the use of complementary and alternative medicine by people with epilepsy, *Epilepsy Behav.* 8 (3) (2006) 620–624, <https://doi.org/10.1016/j.yebeh.2006.01.020>.
- [35] K. Honda, J.S. Jacobson, Use of complementary and alternative medicine among United States adults: the influences of personality, coping strategies, and social support, *Prev. Med.* 40 (1) (2005) 46–53, <https://doi.org/10.1016/j.ypmed.2004.05.001>.
- [36] H. Ni, C. Simile, A.M. Hardy, Utilization of complementary and alternative medicine by United States adults: results from the 1999 national health interview survey, *Med. Care* 40 (4) (2002) 353–358.
- [37] M. Rashrash, J.C. Schommer, L.M. Brown, Prevalence and predictors of herbal medicine use among adults in the United States, *J. Patient Exp.* 4 (3) (2017) 108–113, <https://doi.org/10.1177/2374373517706612>.
- [38] S. Rashidi, H. Farajee, D. Jahanbin, A. Mirfardi, Evaluation of knowledge, belief and operation of Yasouj people towards pharmaceutical plants, *J. Med. Plants* 1 (41) (2012) 177–184.