



Trend and pattern of using herbal medicines among people who are aware of their diabetes mellitus: results from National STEPs Surveys in 2005 to 2011 in Iran

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Received: 30 April 2021 / Accepted: 14 July 2021 / Published online: 20 July 2021
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Abstract

Objectives Use of traditional herbal medicines especially by those affected by chronic diseases, such as diabetes mellitus is important. The objective of this study was to assess trend and Pattern of using traditional herbal medicines by diabetic population in Iran.

Methods The results of this study are extracted from the National Stepwise approach to chronic disease risk factor surveillance (STEPS), conducted in 2005–2016 in Iran. A total of 3095 Iranian diabetic individuals, aged more than 25 years in 2005, 1470 diabetics in 2006, 1633 diabetics in 2007, 1652 diabetics in 2008, 1563 diabetics in 2009, and 1005 diabetics in 2011 were included in this study. We couldn't use data in 2016 because in 2016, traditional herbal use has not been questioned. First, a descriptive analysis of the study variables and prevalence of herbal use for each year, was performed. Thereafter, to determine which variables were independent predictors of adherence to herbal use, we performed multivariate logistic regression.

Results Using traditional herbal medicines among Iranian adult population was increased from 11.1 (9.98–12.20) in 2005 to 23.5 (20.87–26.25) in 2011. The results show increase in herbal medicine use in all age groups, both urban and rural areas, and both male and female over time. Also, we found that using traditional herbal medicines was more common among female compared with male (24.2% versus 21.8%), older than middle-aged people (24.4% versus 15.9%), and people living in urban areas compared with rural area (24.13% versus 20.95%) in 2011.

Conclusion The use of traditional herbs for treatment, alone or in combination with other therapies by the patients who have diabetes has increased over the time. Considering the high level of using traditional herbal medicines in treatment of diabetes and because of the possible herb–drug interactions, policymakers need to take appropriate interventions to control herb store and increase people's knowledge about the herbal usage.

Keywords Herbal medicine · Diabetes mellitus · Complementary therapies · Iran

Abbreviations

CAM Complementary and alternative medicine
IDF International Diabetes Federation

MENA Middle Eastern and North Africa
STEPS STEPwise approach to chronic disease risk factor surveillance

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AOR Adjusted odds ratio
DM Diabetes Mellitus

Introduction

Chronic illnesses, including cardiovascular disease, diabetes mellitus, and cancer, which have higher morbidity and mortality rates, are on the rise [1–4]. Studies have shown that patients, on the other hand, attempt to regulate their ailments via the use of complementary and alternative medicine (CAM) [1, 5], and at times, they experience good results and encourage others to adopt these techniques to cure their problems. The use of CAM among patients with chronic illnesses has significantly increased in several countries across the world [1, 5–8]. Complementary and Alternative Medicine refers to a variety of therapeutic strategies that are utilized largely outside of traditional healthcare settings. Herbal medicine is the most common complementary and alternative medicine (CAM) utilized by patients [5, 7, 9–13]. According to studies, about 80% of chronic patients in Morocco [14], 63.9% of chronic patients in India [15], 41.7% in Iran [16], and 86.4% in the United States [17] utilized herbal medications to treat their diseases [5]. Diabetes, being one of the most prevalent chronic diseases [18], generates enormous morbidity and expenditures for individuals and governments [6]. According to the International Diabetes Federation (IDF), the number of individuals living with diabetes exceeds 10%, and the related expenditures are expected to surpass \$548 billion per year, or 11.0 percent of global health spending [19]. Diabetes has a regional incidence of 10.9% in Middle Eastern and North African (MENA) nations [20]. CAM, which includes acupuncture, herbal medications, homeopathy, traditional medicine, and other medical methods, is an important source of research for the management of diabetes and its complications [21]. Several studies have indicated that therapy with herbal products may play a significant role in meeting diabetes care demands [6, 7, 16, 18], and a large number of patients with diabetes utilize herbal products for treatment [6, 7, 9, 10, 22–27]. Diabetes is common in Iran [16], and the prevalence is believed to be over 10% (IDF), ranking it 11th among nations worldwide [7, 28]. It is also one of the leading causes of mortality in Iran, having risen from 18th in 1990 to 9th in 2018 [29]. It is evident that many people use herbal drugs since herbal medicine plays an important role in Iran [16]. Iran offers a diverse climatic environment and a habitat for a wide range of medicinal plant species.

Understanding the trajectory of herbal usage has major implications for health care system planning and improvement, as well as medical education [8]. Despite the fact that much previous research has addressed CAM usage patterns and attitudes among Iranian patients [7, 16], no study

focusing on the trend of herbal use by diabetes patients in the Iranian community has been found. Furthermore, while current research indicates that several variables influence CAM usage [30], the drivers of herbal use among people with diabetes at the global level are seldom reported, and no particular study has been identified in Iran. This study attempts to address a gap in the existing literature by investigating the usage of herbal medication among Iranian people who are aware of their diabetes mellitus.

Method

The University of Social Welfare and Rehabilitation Sciences granted ethical clearance for the study (IR.USWR.REC.1396.266). Data used in this study was obtained from STEPs survey that is a nationally representative, cross-sectional survey of the Iranian among 15–64 years old that was designed based on the Stepwise guidelines of the WHO [31]. Surveys' data are available for 7 years (2005–2016). In STEPs 2005, 2006, 2007, 2008, 2009 and 2011, data on health characteristics were available for a nationally representative sample of 83,937; 29,272; 29,355; 29,076; 29,202; 12,235 Iranians respectively. STEPs contain similar core and variable supplemental questionnaires for each year. In all of the 2005–2011 STEPs surveys, the traditional herbal treatment is included as a question in their questionnaires. We exclude 2016 STEPs survey because in 2016, traditional herbal use has not been questioned. The herbal use as a treatment for diabetes was measured if the diabetic people responded "YES" to the question: 'Are you currently taking any herbal or traditional remedy for your diabetes?' However, sampling design in 2005 was different but consistency in the sample design in the 2006–2011 STEPs makes it straightforward to compare across other five rounds of STEPs surveys [32, 33]. For this study, we include adults older than 25 years' old who were aware of their diabetes mellitus. Those who were aware of their DM were classified as having answered YES to either of the following two questions: (1) 'Have you ever been informed by a doctor or other health professional that you have diabetes?' (2) 'Are you now taking oral diabetic medicine or insulin as prescribed by a doctor or other health professional?'

After excluding participants aged < 25 years, analysis was performed on data of the remaining for every year. The sample used in this study consists of 3095 adults above 25 years who were aware about their DM in the 2005, with 1470 diabetic adults in the 2006, with 1633 diabetic adults in the 2007, with 1652 diabetic adults in the 2008, with 1563 diabetic adults in the 2009 and 1005 diabetic adults in the 2011 STEPs survey. For analysis of survey data. We use sample weights base on population to sample ratio by province, age and sex. Besides information about diabetes

and use of herbal therapies, STEPs surveys also collected socio-demographic information.

First, the prevalence of herbal use for each year, was performed. Thereafter, we assessed differences in herbal use according to this variable (age, education, sex, residence, Family History of Diabetes and employment status) during 2005–2011. Finally, we merged all datasets and used the chi-square or Fisher's exact tests to evaluate correlations between socio-demographic factors and herbal usage in bivariate analysis. A multivariate logistic regression model contained variables with p.values of < 0.2. As an impact metric, we provided the adjusted odds ratio (aOR) point estimate and 95% confidence interval (95% CI). For analysis of the data, Stata version 14 was used.

Results

Over the course of six years, 12.41% increase in prevalence of Using traditional herbal medicines among Iranian adult population was noted and it increased from 11.1(9.98–12.20) to 23.5(20.87–26.25) from 2005 to 2011. Also, from individuals with diagnosis diabetes mellitus, 20.2% in 2006, 21.1% in 2007, 21.8% in 2008, 23.7% in 2009 used traditional herbal treatment (Table 1). Also, in the 2005–2011 periods, diagnosis diabetes was increased from 5.4% in 2005 to 9.8% in 2011 among Iranian adults aged ≥ 25 . However, between 2005 and 2009, awareness remained relatively stable; the highest level was in 2011.

The prevalence of diabetes treatment with Conventional therapy among Individuals who were aware about their DM by year varied from 64.03% to 73.13%. After 2005 with highest prevalence (73.13%), we found a stable increase from 2006 until 2011 (Table 1).

Also, results from the present study demonstrated that the majority (about 80%) of diabetic individuals used traditional herb as complementary with conventional drugs and except 2005, we found a stable increase in using traditional herbs as complementary from 2006 until 2011.

Sub-population analysis revealed that the increase in herbal treatment is observed across all age, sex, occupation, residential area, and region categories (Table 2).

The prevalence of herbal use for diabetes treatment increased with age and it was higher among older people (15.9% versus 24.4% in 2011). Also, an increasing tendency could be observed in each age group over time. Trends in the prevalence of traditional herb use between males and females were increased. Prior to 2008, males were more likely than women to utilize herbal treatments for confirmed diabetes, but from 2008 to 2011, women used herbal medications more than men. The prevalence of traditional herb use for diabetes treatment increased over the years in both urban and rural areas, from 11.1% to 24.1% and 11.1% to 20.9%, respectively, and the prevalence of traditional herb use in urban areas was significantly higher than that in rural areas (Table 2). We calculated the prevalence of herbal usage based on occupational categorization. From 2005 to 2011, there was a rising trend in herbal usage for diabetes across all classifications. Furthermore, the use of traditional herbs for diabetes treatment was more prevalent among retired persons.(27%).

We conducted analyses in four regions. The regions are defined based on geographical and socioeconomic factors [34]. After classifying the respondents into four area groups, the results showed that the prevalence of traditional herbal use was highest among Southeast participants from 2005 to 2011, increasing from 20.1% to 27.2% between 2005 and 2011.

Logistic regression analyses were carried out to assess the extent to which each factor contributed to the use of herbal therapy while controlling for the impact of the other variables. Adjusted odd ratio showed that using herbal for treatment of diabetes in uneducated or elementary education participants was about 2 times more than participants with academic education (OR = 1.81; 95% CI: 1.08–3.04). People aged ≥ 55 years were more likely to use herbal treatment (OR: 2.08; 95% CI: 1.66–2.60). Retired people were twice more likely to consume herbal for treatment their diabetes than those of employee treatment (OR: 1.97; 95% CI:

Table 1 Prevalence of known diabetes, and rates of Conventional treatment and using herbal medicines among Iranian adult population with known diabetes, 2005–2011

Year (total population)	Prevalence % (95% CI)			Herbal use with conventional treatment
	Known DM	Conventional treatment	Herbal treatment	
2005 n = 3095	5.42 (6.32–6.95)	73.13(71.59–74.61)	11.05 (9.98–12.20)	81.33%
2006 n = 1470	6.19 (5.89–6.51)	64.03(61.57–66.41)	20.20 (18.23–22.33)	70.37%
2007 n = 1633	7.16 (6.83–6.51)	64.87(62.54–67.14)	21.12 (19.21–23.17)	74.35%
2008 n = 1652	7.11(6.79–7.44)	69.17(66.91–71.35)	21.79 (19.87–23.85)	81.67%
2009 n = 1563	6.63(6.32–6.95)	72.11(69.83–74.28)	23.73 (21.69–25.91)	81.35%
2011 n = 1005	11.58(10.90–12.28)	72.10(69.17–74.85)	23.46 (20.87–26.25)	86.16%

Table 2 Prevalence of herbal use by Socio-demographic characteristics among people with KDM, 2005–2011

Variables	Years					
	2005 (n = 3095)	2006 (n = 1470)	2007 (n = 1633)	2008 (n = 1652)	2009 (n = 1563)	2011 (n = 1005)
Age						
25–34	13 (10.66%)	11 (18.33%)	7 (8.64%)	11 (15.71%)	9 (12.16%)	7 (15.91%)
35–44	47 (10.68%)	38 (17.67%)	48 (18.68%)	43 (17.34%)	42 (19.53%)	14 (15.05%)
45–54	125 (11.65%)	102 (21.79%)	117 (21.31%)	121 (22.53%)	103 (21.68%)	59 (25.88%)
≥ 55	157 (10.76%)	102 (20.18%)	175 (22.73%)	185 (23.21%)	217 (27.16%)	144 (24.37%)
Sex						
Female	205 (10.87%)	170 (18.89%)	202 (20.45%)	221 (21.95%)	244 (24.42%)	155 (24.22%)
Male	137 (11.36%)	127 (22.28%)	145 (21.67%)	139 (21.55%)	127 (22.52%)	69 (21.84%)
Residence						
Urban	266 (11.05%)	222 (21.02%)	261 (22.60%)	255 (22.12%)	260 (25.05%)	180 (24.13%)
Rural	76 (11.08%)	414 (18.12%)	86 (17.13%)	105 (21.04%)	111 (21.18%)	44 (20.95%)
Occupation						
Employee	76 (11.67%)	87 (22.37%)	98 (22.95%)	81 (21.26%)	70 (20.06%)	94 (22.87%)
Unemployed	12 (8.33%)	8 (12.70%)	22 (22.22%)	21 (23.33%)	28 (32.56%)	64 (22.70%)
Housekeeper	184 (10.42%)	160 (18.98%)	175 (19.60%)	198 (21.52%)	224 (24.56%)	23 (23.47%)
Retired	38(13.01%)	40 (25.16%)	46 (25.84%)	48 (22.75%)	46 (24.47%)	31 (27.68%)
Region						
Northeast	48 (8.71%)	22 (9.21%)	34 (12.98%)	59 (20.77%)	52 (19.12%)	44(23.53%)
Central	101 (8.73%)	85 (20.38%)	103 (22.39%)	89 (19.47%)	112 (24.24%)	68 (19.54%)
Southeast	46 (20.09%)	37 (24.34%)	58 (30.85%)	52 (28.89%)	49 (34.27%)	16 (27.17%)
West	147 (12.65%)	136 (22.67%)	141 (21.27%)	145 (21.87%)	137 (22.87%)	104 (29.46%)

1.27–3.05). Being female was a positive predictor of herbal use for treatment (OR: 2.10; 95% CI: 0.29–0.43). People who lived in urban area had a 50% (OR: 1.50; 95% CI: 1.13–2.00) higher probability of using herbal for treatment their diabetes. Similarly, living in southeast or west of Iran was a predictor of herbal use compared with who lived in northeast of Iran, with an OR of 1.46 (95% CI: 1.05–2.08) and an OR of 2.51 (95% CI: 1.55–2.39), respectively (Table 3). Note we did not find any relationship between using herbal medication and other socio-demographic variables.

Discussion

The current study found a surprising frequency of traditional herbal use among Iranian individuals who are diabetic. The usage of herbal medicine for diabetes therapy was linked with being elderly ($p=0.01$), female ($p=0.03$), residing in a city ($p=0.01$), not having an academic degree ($p=0.02$), and being retired ($p=0.01$). In addition, from 2005 to 2011, there was an increase in the use of herbal therapy. Traditional herb usage for diabetes therapy grew over time in both urban and rural regions, and traditional herb use in urban areas was consistently greater than in rural areas.

In addition, we discovered that traditional herbal use had a geographical distribution. Using traditional herbal remedies for diabetes therapy is more common in the southeast of Iran than in other regions.

Between 2005 and 2011, six cross-sectional surveys were carried out using the same techniques. Consistent with earlier research [7, 10, 12, 16, 32, 35–37], the results revealed that the prevalence of diabetes awareness, conventional therapy, and herbal medication for diabetes treatment all rose considerably from 2005 to 2011. The most recent trends in diabetes awareness in Iran are consistent with the findings of earlier studies [32]. Furthermore, the rising rates of herbal medication usage are consistent with research that shows a rise in the prevalence of herbal use in diabetes [7, 10, 16, 18, 37–41]. According to studies, the prevalence of herbal usage among diabetes patients ranges from 13 to 70% [6, 7, 10, 16, 39]. The considerable variance in prevalence might be explained by the heterogeneity of the research, various definitions, geographical variations, and the use of diverse sampling methodologies. Iran is a country steeped in tradition. Herbs are often used in the treatment of chronic illnesses such as diabetes [7, 16]. The ease of access and increased retail sales, reduced cost, and acceptance of herbal use in Iran may explain why almost one in every four diabetes patients (23.46%) used herbals in 2011.

Table 3 Logistic Regression Estimates for herbal use by Socio-demographic characteristics among people with KDM

Explanatory variables	OR (95% CI)	p-value
Age		
25–34	1.00(Reference)	
35–44	0.76 (0.55 to 1.05)	0.45
45–54	1.16 (0.74 to 1.91)	0.55
≥ 55	2.08 (1.66 to 2.60)	0.01
Sex		
Male	1.00(Reference)	
Female	2.10 (0.29 to 0.43)	0.03
Education		
Academic degree	1.00(Reference)	
Uneducated or elementary	1.81 (1.08 to 3.04)	0.04
Residence		
Rural	1.00(Reference)	
Urban	1.50 (1.13 to 2.00)	0.01
Family History of Diabetes		
No	1.00(Reference)	0.70
Yes	1.10 (0.65 to 1.87)	
Occupation		
Employee	1.00(Reference)	
Unemployed	1.31 (0.77 to 2.17)	0.31
Housekeeper	1.10 (0.65 to 1.82)	0.21
Retired	1.97 (1.27 to 3.05)	0.01
Region		
Northeast	1.00(Reference)	
Central	1.02 (0.68 to 1.45)	0.99
Southeast	1.46 (1.05 to 2.08)	0.04
West	2.51 (1.55 to 3.99)	0.01

Our findings were similar to earlier studies on diabetes patients by Hashempurin et al. [7] in Iran, Ching et al. [42] in Malaysia, and Chung-Hsuen Wu et al. in the United States [12, 43]. Our findings revealed that elderly people were more likely to utilize traditional herbs. This could be attributed to the elderly's strong cultural and religious beliefs. In addition, a statistically significant variation in the incidence of herbal usage between age groups was discovered in 2006, 2007, and 2009. There are significant disparities between males and females, with women being more likely to utilize traditional medicines for diabetes treatment.

Paradoxically, inhabitants of urban regions are more likely to use herbal medicines than those in rural ones. This disparity in herbal use may be due to a lack of access to retail outlets and easy accessibility in cities, as well as greater rates of awareness among city inhabitants [6]. This difference was likewise determined to be significant. When data were stratified by area, there were substantial disparities in all years. Furthermore, as compared to those living in the

northeast, the rate of herbal usage is significantly greater in the west and southeast of Iran. This conclusion is consistent with earlier research, which found that CAM usage among DM patients varied between districts [10, 44]. Moreover, there was a substantial difference in herbal usage between diabetes patients who had retired and those who were still working.

Data from nationally representative surveys were used in this investigation (population-based). To the best of our knowledge, this is the first report on the patterns and trends in the pervasiveness of herbal remedies among Iranian people who are aware of their diabetes mellitus, and it adds to a growing body of literature on complementary and alternative medicine use in Iranian patients with diabetes mellitus. As a result, the current study's main practical value is that it provides large-scale and much-needed empirical data on the actual behavior of people who are aware that they have diabetes mellitus and what they do most of the time to manage their diabetes. Based on this, it is critical to enhance people's knowledge of adequate herbal remedies and how to utilize them for diabetes management. Furthermore, pharmacists, doctors, and nurses have a lot of potential to serve as information providers for people who self-medicate with herbal medicines.

There were several limitations to this study that needed to be addressed, including the following: we did not have information regarding herb usage in 2016 STEPs, therefore we had to remove it and report till 2011. As a result, it is recommended that information be gathered in the subsequent rounds. The most significant drawback of this study is that individuals may offer replies that they feel are socially desirable due to self-report of herbal usage and diabetes. Intervention studies as well as laboratory measures should be conducted in this respect. In addition, because we lacked a list of traditional herbs, we were unable to report the prevalence of intake depending on plant type. The study might be expanded to longitudinal and comparative approaches.

Conclusion

Traditional herbs have never become obsolete and still play a prominent role in human health care [9]. High using of herbal medicines without evaluation- alone or in combination with other therapies- may be having serious health outcomes. Considering the high level of using traditional herbal medicines in treatment of diabetes, policymakers and healthcare providers need to give appropriate and enough information about herbal medicine.

Acknowledgements The study was provided ethical approval by the University of Social Welfare and Rehabilitation Sciences (IR.USWR.REC.1396.266). The authors of this paper thank the authors whose

publications they cited for their contributions and Non-Communicable Diseases Research Center of Tehran University

Authors' contributions All authors participated and approved the study design. General designing of paper: HR, FF, SA, FN, HS. Designing of methods: FF, NA, MY, SA. Analysis: HR, SA, SFI, MY, NA. Result interpretation: FF, SFI, HR, FN, SA, HS. Writing primary draft: SA, HR. Manuscript revision: All. All authors read and approved the final manuscript.

Data availability The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate The study was provided ethical approval by the University of Social Welfare and Rehabilitation Sciences (IR.USWR.REC.1396.266).

Consent for publication Not applicable.

Conflict of interest The authors declared that they have no conflict of interests.

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