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Original Paper

Using Medicinal Plants Among Patients With Cardiovascular Diseases and Their Related Factors: A Cross-Sectional Study

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ABSTRACT

Introduction: The use of Medicinal Plants (MP) is increasing among the general population and patients with Cardiovascular Diseases (CVD). Simultaneous use of MP and cardiac medications can cause drug interactions and serious complications.

Objective: This study aimed to determine the frequency of MP use and its related factors among patients with CVD.

Materials and Methods: This cross-sectional study was conducted on 200 patients with CVD in 2018. The patients were consecutively recruited from the cardiac care clinic in an Educational and Medical Center in Kashan City, Iran. The study data were collected using an MP use questionnaire, the related factors of the MP use questionnaire, and the belief and attitudes about herbal medicine inventory. For data analysis, the logistic regression analysis was performed.

Results: The Mean±SD age of the participants was 56.91±10.64 years. Their Mean±SD time passed from CVD diagnosis was 8.30±9.07 years. The frequency of MP use over the past year was 90.5% (95% CI; 86.4%–94.6%). The significant related factors of MP use were female gender (OR=4.80, 95% CI; 1.43–16.1, P=0.011), positive family history of MP use (OR=8.84, 95% CI; 2.62–29.86, P=0.0001), and knowledge about herbal medicine (OR=1.93, 95% CI; 1.13–3.30, P=0.017).

Conclusion: MP use is highly prevalent among patients with CVD. MP-related counseling services should be provided to patients with CVD.

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Highlights

• The use of medicinal plants among patients with cardiovascular diseases is prevalent.

• Female gender, positive family history of medicinal plant use, and knowledge about herbal medicine increase the likelihood of medicinal plant use.

• There is still some considerable controversy about factors affecting the use of herbal medicine.

Plain Language Summary

Cardiovascular Diseases (CVDs) are the first leading cause of death in the world and Iran. Herbal medicine is widely used to prevent and treat CVDs in developing countries. Some studies have been published on determinants or the most salient predictors of herbal medicine utilization. However, there is still controversy with regard to reasons of using herbal medicine by patients with CVDs. We undertook this study to determine the related factors of Medicinal Plant (MP) use among patients with CVDs.

The results showed that using medicinal plants among patients with CVDs is common, and most patients use medicinal plants without receiving education and consultation from healthcare providers. Knowledge about herbal medicine, female gender, and positive family history of MP use were the significant related factors of MP use among patients with CVDs.

Introduction

Cardiovascular Diseases (CVD) are the leading cause of death in the world [1] and Iran [2]. Patients with CVDs usually receive different medications [3]. Studies show that patients with chronic conditions like CVD use herbal medicine (HM) products. A systematic review showed that the prevalence of using HM in different countries ranges from 2% to 46% [4]. A descriptive study also reported that with a prevalence of 85.9%, HM was the most commonly used complementary therapy among patients with CVD [5]. Similarly, a study in Iran reported that patients with CVDs tend to use HM. In this study, Cichorium intybus L, Berberis integerrima, Zizyphus jujube, Suaeda aegyptiaca, and Anthemis austroiranica were the most commonly used medicinal plants [6].

Most patients with CVDs use HM based on the recommendations of laypeople without informing and consulting healthcare providers [7]. The simultaneous use of HM products with chemical medications can cause drug interactions [8, 9] and serious complications which are sometimes irreparable such as ventricular arrhythmia, low heart rate, fluctuation in blood flow velocity, serious bleeding events, and severe allergic reactions [10]. Because of the different side effects of over-the-counter use of HM [9], healthcare providers, particularly nurses, need to implement programs to identify at-risk patients and provide them with quality education about the safe use of HM [11]. A prerequisite to such programs is identifying factors contributing to HM use [8].

Many different factors contribute to the use of HM. A study in Malaysia reported gender, marital status, affliction by health problems, and income as the predictors of HM use [12]. Studies in Iran also showed that the most important factors affecting HM use were educational level [7, 13], place of residence [14], familiarity with HM [15], insurance coverage, family size [16], and gender [14]. Attitude [16] and cultural and ethnic contexts [12] can also affect HM use. However, some studies reported that HM use was not significantly correlated with age [13, 14], marital status [7, 14], income [13, 14, 16], educational level [7, 13], place of residence [16], and occupation [13, 16].

Given the contradictory results of previous studies on the contributing factors of HM use by cardiac patients, the present study was conducted to produce firmer evidence in this area. This study aimed to determine the frequency of medicinal plant (MP) use and its related factors among patients with CVD.

Materials and Methods

This cross-sectional study was conducted in 2018 (from April to June). The sample size was calculated based on a former study that reported that the prevalence of HM use among patients with hypertension was 29.4% [7]. Accordingly, with a confidence level of 0.95 and a precision of 0.1 of HM use prevalence (i.e., a d of 0.069), it was estimated that 199 patients were necessary. The study participants were 200 patients with CVD who came to the clinic to doctor appointments, to request medication, or follow up on their treatment and laboratory tests. The patients were consecutively recruited from the cardiac care clinic in Kashan City, Iran. The inclusion criteria were definitive diagnosis of CVD established by a cardiologist, use of cardiac medications for at least three months, aged over 18, no self-report history of cognitive disorders, Iranian nationality, ability to communicate verbally, and agreement for participation. The exclusion criteria were reluctance to stay in the study and refusal to answer study instruments.

The study data were collected using an MP use questionnaire, the related factors of the MP use questionnaire, and the belief and attitudes about herbal medicine inventory. The MP use questionnaire was a researcher-made instrument with four items on MP use in the past year, the type of MPs used, the reason for their use, and their perceived effectiveness. The related factors of the MP use questionnaire was a researcher-made instrument with 17 items that were based on a literature review and the opinion of experts. Nine items were about demographic and clinical characteristics, namely age, gender, marital status, educational level, occupation, monthly income, place of residence, type of CVD, and the time passed from diagnosis. One item was related to knowledge about HM, two items were related to a perceived threat of CVD, and five items were about familiarity with HM in the following areas: family history of MP use, the relation of patient's occupation with HM, consulting healthcare providers about MP use, receiving education from healthcare providers about MPs, and use of MPs in the past year (even one-time use to help to treat or prevent complications). The only item on HM-related knowledge was scored on a 1–7 Likert scale, while the two items on perceived threat were scored on a 1–5 scale, and the mean score of the two items was considered the perceived threat score.

The qualitative content validity of the MP use questionnaire and the related factors of the MP use questionnaire were assessed by six faculty members who had experience in the relevant field. The reliability of the related factors of the MP use questionnaire was assessed through the test-retest method, in which the questionnaire was twice completed at a 1-week interval with 20 patients with CVD. The Intraclass Correlation Coefficients (ICC) of the knowledge and the perceived threat dimensions of the questionnaire were respectively 0.955 and 0.971, and the Kappa values of the items of the familiarity with HM dimension and the MP use questionnaire were equal to 1.

The patient's beliefs and attitudes as a possible related factor were assessed by the belief and attitude about herbal medicine inventory (BAHMI). BAHMI was deductively developed by Gholami et al. based on the theory of planned behavior. It consists of 33 items in five domains of behavioral beliefs, normative beliefs, perceived personal barriers, perceived general barriers, and reality-based beliefs. Each item is scored on a 1–7 scale (from "completely disagree" to "completely agree"), resulting in a possible total score of 33 to 231. Higher scores stand for a more positive attitude towards HM use. The validity of this inventory was assessed and confirmed, and its reliability was confirmed by calculating the Cronbach alpha and a stability coefficient of more than 0.9 [17]. The score of this inventory was considered as the possible related factors of MP use in the present study.

All instruments were completed for participants through face-to-face interviews. The obtained data were analyzed using the SPSS version 16.0. Numerical variables were described using the measures of central tendency and dispersion, while categorical variables were described using absolute and relative frequencies. The logistic regression analysis was performed to determine the related factors of MP use. Initially, the relationship of each potential predictor with MP use was examined through univariate analysis, and crude Odds Ratio (OR) was calculated for variables that had a significant relationship with MP use. Then, variables with a significant relationship with MP use (a significance level of less than 0.2) were entered into multiple logistic regression analyses with the Enter method. Adjusted OR was calculated for variables that significantly predicted MP use. The Kolmogorov-Smirnov test checked the data normality. The level of significance was set at less than 0.05.

Results

During sampling, 276 patients were approached. Thirty patients refused participation, and 41 were ineligible. Accordingly, 205 patients were included in the study. Five participants refused to answer the study instruments and were excluded. Final data analysis was done on the data collected from 200 patients.

Table 1. Participants' characteristics, medicinal plants use, and the results of univariate analyses to determine the related factors

Characteristics		No. (%)/Mean±SD			Univariate Analysis			
		Total	MP Use		P	Crude Odds Ratio (OR)	95% CI	
			No (n=19)	Yes (n=181)			Lower	Upper
Gender	Male*	80(40)	12(63.2)	68(37.6)	0.036	2.85	1.07	7.59
	Female	120(60)	7(36.8)	113(62.4)				
Marital status	Married	182(91)	16(84.2)	166(91.7)	0.557	—	—	
	Single	3(1.5)	1(5.3)	2(1.1)				
	Divorced	1(0.5)	0(0)	1(0.6)				
	Widowed	14(7)	2(10.5)	12(6.6)				
Educational level	Illiterate	61(30.5)	5(26.3)	56(30.9)	0.984	—	—	
	Primary	76(38)	8(42.1)	68(37.6)				
	Secondary	22(11)	2(10.5)	20(11)				
	Diploma	34(17)	4(21.1)	30(16.6)				
	Higher	7(3.5)	0(0)	7(3.9)				
Occupation	Employee	12(6)	1(5.3)	11(6.1)	0.63	—	—	
	Retired	37(18.5)	4(21.1)	33(18.2)				
	Housewife	107(53.5)	7(36.8)	100(55.2)				
	Self-employed	31(15.5)	4(21.1)	27(14.9)				
	Farmer	7(3.5)	0(0)	7(3.9)				
	Unemployed	6(3)	3(15.8)	3(1.7)				
Income ($USA/m)	< 200	74(37)	10(52.6)	32(17.7)	0.332	—	—	
	200–400	103(51.5)	7(36.8)	96(53)				
	> 400	23(11.5)	2(10.5)	21(11.6)				
Place of residence	Urban areas	172(86)	19(100)	153(84.54)	0.273	—	—	
	Rural areas	28(14)	0(0)	28(15.46)				
Relation of patient's occupation with HM1	Yes	15(7.5)	1(5.3)	14(7.7)	0.699	—	—	
	No	185(92.5)	18(94.7)	167(92.3)				
Positive family history of MP2 use	Yes	168(84)	9(47.4)	159(87.8)	0.0001	8.03	2.94	21.94
	No*	32(16)	10(52.6)	22(12.2)				
Consulting healthcare providers about MPs	Yes	13(6.5)	0(0)	13(7.2)	0.999	—	—	
	No	187(93.5)	19(100)	168(92.8)				
Receiving healthcare providers' education about MPs	Yes	6(3)	1(5.3)	5(2.8)	0.55	—	—	
	No	194(97)	18(94.7)	176(97.2)				

Characteristics	No. (%)/Mean±SD			Univariate Analysis			
	Total	MP Use		P	Crude Odds Ratio (OR)	95% CI	
		No (n=19)	Yes (n=181)			Lower	Upper
Age (y)	56.91±10.64	57.42±8.34	56.85±10.88	0.826	—	—	
Time passed from CVD3 diagnosis (M)	99.62±108.85	87.47±72.83	100.90±112.03	0.609	—	—	
HM-related knowledge	1.195± 2.595	1.19±1.73	1.16±2.68	0.002	2.37	1.389	4.05
Perceived threat	1.091±3.712	1.21±3.18	1.06±3.76	0.03	1.60	1.045	2.441
HM-related belief and attitude	27.33±153.55	32.63± 141.74	26.40± 154.80	0.049	1.017	1	1.03

*Reference group.

The Mean±SD age of the participants was 56.91±10.64 years. Most participants were female (60%) and had primary educational levels (76%). The most common CVDs were hypertension (60%) and then myocardial infarction (30.5%). Their Mean±SD time passed from CVD diagnosis was 8.30±9.07 years. The participants' mean scores of HM-related knowledge and attitude were respectively 2.59±1.19 in the possible range of 1–7 and 153.55±27.23 in the possible range of 33–231 (Table 1).

Table 2. The frequency of medicinal plants used by participants over the past year

Rank	MP* Name	No. (%)		Rank	MP Name	No. (%)	
		(n=200)	(n=181)1			(n=200)	(n=181)[1]
1	Mint	119 (59.5)	119 (65.7)	15	Cardamom	18(9)	18(10)
2	Pussy willow	105(52.5)	105(58)	16	Eryngium	17(8.5)	17(9.4)
3	Rose water	80(40)	80(44.2)	17	Asteraceae	16(8)	16(8.8)
4	Thyme	77(38.5)	77(42.5)	18	Garlic	15(7.5)	15(8.3)
5	Chicory	72(36)	72(39.8)	19	Descurainia sophia	15(7.5)	15(8.3)
6	Boraginaceae	56(28)	56(30.9)	20	Damask rose	14(7)	14(7.7)
7	Cinnamon	51(25.5)	51(28.2)	21	Cumin	14(7)	14(7.7)
8	Ginger	34(17)	34(18.8)	22	Althaea officinalis	13(6.5)	13(7.2)
9	Violet	32(16)	32(17.7)	23	Liquorice	12(6)	12(6.6)
10	Green tea	25(12.5)	25(13.8)	24	Hibiscus sabdariffa	9(4.5)	9(5)
11	Psyllium	22(11)	22(12.2)	25	Valerian	8(4)	8(4.4)
12	Citrus aurantium	21(10.5)	21(11.6)	26	Lemon	7(3.5)	7(3.9)
13	Dill	20(10)	20(11)	27	Lavender	6(3)	6(3.3)
14	Jujube	18(9)	18(10)	28	Other**	90(45)	90(49.7)

*MP: Medicinal plant; **Other MPs include more than fifty plants such as Crocus haussknechtii, Alhagi, Arctium minus Hill, Platanus, Ocimum basilicum, Urtica, Alyssum, etc.

The number of patients who used each of these MPs was less than 4.

[1]: In total, 181 patients had used MPs in the past year. The frequency values in this column were calculated based on the total number of MP users

Table 3. Multiple variate analyses to determine related factors of medicinal plants (MP) use

Characteristics		No. (%)/Mean±SD			Multiple analysis**			
		Total	MP use		P	Adjusted OR	95% CI OR	
			No (n=19)	Yes (n =181)			Lower	Upper
Gender	Male*	80(40)	12(63.2)	68 (37.6)	0.011	4.80	1.43	16.1
	Female	120(60)	7(36.8)	113(62.4)				
Positive family history of MP2 use	No	185(92.5)	18(94.7)	167(92.3)	0.0001	8.84	2.62	29.86
	Yes	168(84)	9(47.4)	159(87.8)				
	No*	32(16)	10(52.6)	22(12.2)				
HM-related knowledge (in the possible range of 1–7)		1.195±2.595	1.19±1.73	1.16±2.68	0.017	1.93	1.13	3.30
Perceived threat (in the possible range of 1-5)		1.091±3.712	1.21±3.18	1.06±3.76	0.116	—	—	—
HM-related belief and attitude (in the possible range of 33–231)		27.33±153.55	32.63±141.74	26.40±154.80	0.264	—	—	—

* Reference group

** Logestic regression: The variables with statistically significant association on univariate analysis were entered into multiple logistic regression analysis

The relative frequency of MP use in the past year was 90.5%, with a 95% Confidence Interval (CI) of 86.4%–94.6%. All MP users noted that they used MPs without consulting healthcare providers. The most commonly (65.7%) used MP was mint (Table 2), and the most common reasons for using MPs were to prevent or manage the symptoms of CVD (70.2%), gastrointestinal problems (66.3%), respiratory problems (46.4%), neurologic problems (18.8%), and diabetes mellitus (16.6%). The perceived effectiveness of MPs was low in 9.4%, moderate in 26.5%, high in 44.2%, very high in 14.4%, and ineffective in 5.5% of participants.

Univariate analysis showed that factors such as HM-related knowledge, HM-related belief and attitude, gender, perceived threat, and positive family history of MP use had significant effects (P<0.05) on MP use (Table 1). The results of multiple regression analysis adjusted for the confounding effects of other variables showed that the significant predictors of MP use were female gender (OR= 4.80, 95% CI; 1.43–16.1, P=0.011), positive family history of MP use (OR=8.84, 95% CI; 2.62–29.86, P=0.0001), and HM-related knowledge (OR=1.93, 95% CI; 1.13–3.30, P=0.017) Table 3.

Discussion

This study evaluated the related factors of MP use among patients with CVD. Findings showed that 90.5% of participants had used MPs in the past year, and 70% of MP users had used them to prevent or manage the symptoms of cardiovascular disease. The high rate of MP use in the present study agrees with the findings of a former study on the general population of a city in Iran [13] but is different from the finding of several studies on patients with CVD. For instance, studies showed that the rate of MP use was 56.9% among patients with hypertension in Freetown, Sierra Leone [18], and 29.4% among patients with hypertension in Kerman City, Iran [7]. The high prevalence of MP use in the present study may be due to the long history of producing and processing different MPs and the high number of MP stores in Kashan, Iran.

Study findings showed HM-related knowledge is one of the significant predictors of MP use among CVD patients, and increasing the mean knowledge score was associated with increasing the likelihood of MP use. This finding is in line with the findings of two earlier studies [15, 19]. A positive relationship between knowledge and health-related behaviors, particularly among patients with chronic conditions, has frequently been reported in different studies [19-21]. The mentioned finding is not far-fetched. It is expected that when patients become aware of these uncomplicated and helpful methods, they try those methods.

Study findings also showed a positive family history of MP use as another predictor of MP use among patients with CVDs. A former study reported subjective norms (i.e., the formation of one's beliefs by the attitudes and behaviors of significant others) as a significant predictor of HM use among women in a city in Iran [19]. This finding was consistent with this study's findings. Similarly, a study showed that family members' experience of using complementary therapies was a significant predictor of their use among people with diabetes mellitus [22]. Moreover, several studies noted that most patients use HM following their family members' recommendations [7, 18]. This finding may be due to patients' trust in their family members' sayings and experiences or their direct observation of the effectiveness of HM products among their family members.

Gender was the other significant predictor of MP use in the present study. Similarly, a study in Malaysia reported gender as a significant predictor of using HM [12], and two other studies reported a significant relationship between gender and HM use [7, 23]. The wide use of MPs by women may be because a large proportion of women are homemakers and are more significantly affected than men by culture and traditions. However, some studies reported that gender had no significant relationship with the frequency of HM use [22, 24].

Multivariate analyses showed that after removing the confounding effects of other factors, the effects of HM-related belief and attitude on MP use were not significant. This finding is in agreement with the findings of a former study [24] and disagreement with the findings of several other studies [12, 16, 19, 25]. The relationship between attitude and behavior has frequently been addressed in different studies and theories [26, 27]. The insignificant effects of HM-related belief and attitude on MP use in the present study may be because we assessed participants' HM-related beliefs and attitudes by asking questions about their beliefs and attitudes at the time of the study, while we assessed their MP use behaviors over the past year. Belief and attitude may change over time, and hence, participants' beliefs and attitudes at the time of data collection might not have reflected their beliefs and attitudes over the past year.

Study findings showed the insignificant effects of educational level and occupation on MP use among patients with CVD. Earlier studies also reported the same findings [18, 19, 22]. Moreover, in line with the findings of several earlier studies [16, 18, 19, 24, 28], we found that age had no significant relationship with MP use. However, a study in the USA reported patients' age as a significant factor affecting the use of HM [25].

In addition, our findings showed that marital status had no significant relationship with MP use. This finding is in line with the findings of several earlier studies [7, 14, 18] and contradicts the findings of two others studies [12, 24]. The insignificant effects of age and marital status on MP use in the present study can be due to the homogeneity of the study population respecting these two factors and the statistical methods used for their analysis. In addition, the high average age of the participants in the present study should not be ignored.

We also found that neither consultation with healthcare providers about MP use nor receiving their MP-related education significantly affected MP use. Because of healthcare providers' lack of knowledge about HM and their indifference to the growing public interest in HM in Iran, patients' wide use of MP can significantly be affected by their significant others' beliefs and behaviors. Further studies are needed to provide firmer evidence in this area.

Moreover, our findings showed no significant relationship between time passed from CVD diagnosis and MP use. This finding contradicts the findings of two former studies [22, 24]. Easy access to MP in Kashan can explain this finding and this contradiction.

One of the strengths of this study was data analysis through multivariate analyses, which helped produce reliable data. Meanwhile, the study faced some limitations. For instance, it was conducted on a consecutive sample of patients and in a single cardiac care clinic, though the clinic was the most prominent cardiac care center in Kashan, Iran. Moreover, HM-related knowledge was assessed only through a self-report questionnaire. Future studies are recommended to circumvent these limitations. Moreover, qualitative studies are needed to further explore factors affecting MP use among patients with CVD.

This study found that using MPs without consulting healthcare providers is highly prevalent among patients with CVD. Gender, HM-related knowledge, and positive family history of MP use are the significant predictors of MP use among these patients. MP-related counseling services in healthcare centers are recommended for patients with CVD, particularly those who are at risk for the adverse effects of their over-the-counter use.

Ethical Considerations

Compliance with ethical guidelines

The Institutional Review Board and the Ethics Committee of Kashan University of Medical Sciences (KAUMS), Kashan, Iran, approved this study (Code: IR.KAUMS.NUHEPM.REC.1396.15). Written permission for the study was obtained from the Research and Technology Administration of Kashan University of Medical Sciences and provided to the authorities of the study setting. The aims, methods, and benefits of the study were clearly explained to participants, and they were informed that participation in and withdrawal from the study would be voluntary and cause them no problem. Moreover, they were ensured of the confidential data management, and written informed consent was obtained from all of them. Data collection was done in a private room in the presence of one of the researchers.

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Authors' contributions

Conceptualization: Mostafa Gholami, Zahra Tagharrobi, Khadijeh Sharifi, and Zahra Sooki; Writing the manuscript: Mostafa Gholami and Zahra Tagharrobi; Data collection: Mostafa Gholami; Data analysis: Mostafa Gholami and Zahra Tagharrobi; Approval of the final version: All authors.

Conflict of interest

The authors declared no conflict of interest.

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