TRADITIONAL AND INTEGRATIVE MEDICINE

Trad Integr Med, Volume 9, Issue 1, Winter 2024

Original Research

Utilization of Complementary and Alternative Medicine among Patients with Cardiovascular Disease in Iran: A Cross-sectional Study

Mohammad Hossein Sharifi[1] , Salman Mohammadi[2], Naseh Pahlavani[3], Ali Ghaffarian-Bahraman[4], Sara Darabi[5] , Mohammad Hossein Nikoo[6], Mohammad Ebrahim Zohalinezhad[5]*

[1]Research Center for Traditional Medicine and History of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
[2]Nutritional Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran
[3]Health Sciences Research Center, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran
[4]Occupational Environment Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran
[5]Research Center for Traditional Medicine and History of Medicine, Department of Persian Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
[6]Non-Communicable Diseases Research Center, Shiraz University of Medical Sciences, Shiraz,Iran

Received: 23 Aug 2023 **Revised:** 13 Nov 2023 **Accepted:** 14 Jan 2024

Abstract

Complementary Alternative Medicine (CAM) has been widely used globally, but limited data are available on the use of CAM in Cardiovascular Disease (CVD). The present study aimed to evaluate CAM use in CVD patients. The present cross-sectional study was performed in Shiraz, Iran, during the summer of 2021. Cardiovascular patients aged ≥ 18 years were included in the study. Demographic information on left ventricular ejection fraction and satisfaction with CAM utilization was collected using validated questionnaires. A total of 304 patients (194 males and 110 females) were recruited for this study. The frequency of patients identified as CAM users was 56.9% (n = 173). Patients with implanted pacemakers were less likely to use CAM than others (OR = 0.50, p = 0.031). Meanwhile, the likelihood of CAM utilization was approximately 2 and 4 times higher in the patients categorized in class I of the New York Heart Association (NYHA) functional classification compared to those in the second and third classes, respectively. Most CAM users used herbs, dietary supplements, and praying to prevent diseases, while Traditional Persian Medicine (TPM) remedies and acupuncture were more commonly used to treat acute and chronic illnesses, respectively. Praying for health, herbal therapy, and dietary supplementation were the most popular CAM types utilized by Iranian CVD patients. However, future investigations seem to be required to determine the exact physiological impacts, probable adverse effects, and long-term benefits of CAM therapies in this population.

Keywords: Complementary and alternative medicine; Traditional Persian medicine; Cardiovascular disease; NYHA classification; Left-ventricular ejection fraction; Traditional medicine

http://doi.org/10.18502/tim.v9i1.15085

Citation: Sharifi MH, Mohammadi S, Pahlavani N, Ghaffarian-Bahraman A, Darabi S, Nikoo MH, et al. **Utilization of Complementary Medicine among Patients with Cardiovascular Disease in Iran: A Cross-Sectional Study**. Trad Integr Med 2024;9(1):13-23. http://doi.org/10.18502/tim.v9i1.15085

*Corresponding Author: Mohammad Ebrahim Zohalinezhad
Research Center for Traditional Medicine and History of Medicine, Department of Persian Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
Email: zohalinm@yahoo.com, zohalinm@sums.ac.ir

Introduction

Cardiovascular disease (CVD) is the leading cause of global mortality and one of the most serious health problems. In 2016, CVD was responsible for approximately one-third of all deaths worldwide [1]. According to predictions, CVD will cause more than 23 million global deaths by 2030 [2]. It was also estimated that cardiovascular disease had resulted in 35.6 million years of living with a disability worldwide until 2017 [3,4]. Hence, today CVD is responsible for significantly reducing the quality of life as well as increasing the huge costs of treatment and health in different countries [5]. Recent studies in Iran showed that CVD is the main cause of 46% of all deaths and 20 to 23% of the disease burden [6].

Due to the nature of the disease, medication is an important part of long-term CVD management. It has been reported that more than 60% of individuals with CVD use medication as the main disease treatment [7,8]. However, the use of many pharmacological agents is associated with specific side effects [8]. A growing interest is observed among CVD patients in using complementary and alternative medicine (CAM) and herbal remedies to prevent and treat cardiovascular diseases [9,10]. Nonetheless, limited data is available on the use of CAM in patients with CVD in developing countries.

According to World Health Organization (WHO), CAM is defined as a set of knowledge, skills, and practices that emerged based on the theories, beliefs, and indigenous experiences of different cultures, which is historically used in the prevention, diagnosis, improvement, and treatment of physical and mental illnesses [11,12]. Generally, CAM is divided into two categories of biological therapies, including the consumption of herbal medicines, vitamins, and dietary supplements and non-biological therapies such as acupuncture, hydrotherapy, massage, etc. [13].

Traditional Persian Medicine (TPM) is one of the wealthiest and age-old types of CAM, offering a holistic viewpoint on health and disease [14,15]. TPM is based on the concept of four humors (Ákhlāt): sanguine (Dám), bile (Sáfrā), phlegm (Bálghám), and black bile (Sáudā), also known as Iranian medicine or humoral medicine [15,16]. The doctrines of health care and illness prevention by lifestyle modifications have been described by Persian scholars such as Avicenna in the *Canon of Medicine* and Razes in the *Liber Continens* [17,18]. In addition, other principles of treatment (nutrition, herbal or other natural-derived medicines, and physical methods such as massages (Dálk), cupping, focal pressure applied using a finger or needle (Ghámz), and exercise therapy) have possessed secondary importance [15].

In many countries, although CAM is not fully integrated into healthcare systems, it is used in conjunction with other conventional therapies to improve health and treat diseases [19,20]. CAM utilization has been reported by at least 80% of member countries of WHO and more than 90% of countries in the Eastern Mediterranean, Southeast Asia, and western Pacific regions [21].

Despite the lack of adequate documents regarding the safety and cost-effectiveness of CAM, scientific literature has indicated an increasing demand for CAM use [19]. The improper use of CAM therapies may compromise the effective medical management of CVD. For instance, the potential of herbal treatment to induce drug interactions is an issue of great concern in heart patients due to the narrow treatment window for CVD conditions [22,23]. Therefore, understanding the prevalence and nature of CAM in heart patients is essential to encourage useful CAM therapies and prevent inappropriate interventions. The present study aims to investigate the prevalence of CAM use in a population of cardiovascular patients living in Shiraz, southern Iran.

Methods

Patients and Study Design

The present cross-sectional study was performed in the heart subspecialty of Imam Reza Clinic in Shiraz, southern Iran during the summer of 2021. Patients aged≥ 18 years who were diagnosed with CVD by a cardiologist were included in the study via convenience sampling. All the participants completed and signed the informed consent form. The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences (ethics code: IR.SUMS.MED.REC.1400.189).

Sample Size Calculation and Sampling

The sample size in this study was calculated assuming a level of use of complementary medicine of about 56% among cardiac patients [24], type 1 error of 5% and statistical estimation accuracy of 10% prevalence. The study's sample size was estimated to be 300 patients. The participants were selected by the convenience sampling method.

Questionnaires and Data Collection

The Persian version of the previously validated semi-organized International Questionnaire to Measure Use of Complementary and Alternative Medicine (I-CAM-Q) was used to collect information [25-27]. This 29-item questionnaire included questions about demographic information such as gender, age, body weight, height, education level, ethnicity, employment status, history of medical intervention and hospitalization, duration of disease, area of residence, and socioeconomic status. Information about CAM utilization

included the main reasons and duration of CAM use, source of familiarity and information, level of satisfaction with CAM consumption, and consulting with physicians before using CAM.

Definitions

The participants were classified as CAM users if they had used one of the main types of CAM at least once in the past three months, including referring to a TPM therapist (physician or non-physician) or spiritual therapist or using herbal therapy, chiropractic, acupuncture, homeopathy, or dietary supplements. Information about mental-training practices including Yoga, Chi-kung, Meditation, Tai-chi, relaxation, mental imaging, attending traditional therapy sessions, and praying for health was collected, as well. The exclusive utilization of mental-training practices did not classify a participant as a CAM user unless one of the main types of CAM was used alongside [25].

CVD patients were stratified into four categories according to the severity of the symptoms of heart disease using the NYHA functional classification: *I.* no symptoms or restriction on physical activities such as climbing stairs, *II*. mild symptoms such as angina and difficulty breathing after physical activities, *III.* significant symptoms such as difficulty breathing and chest pain even during mild physical activities, but no problem at rest, and *IV.* severe symptoms even at rest [28]. The participants were also classified into three categories based on Left-ventricular Ejection Fraction (LVEF) using ACCF/AHA guidelines: normal EF ($50\% \leq EF < 70\%$), borderline EF ($40\% < EF < 50\%$), and reduced EF ($\leq 40\%$) (29).

Statistical Analysis

In order to assess the data distribution model, Shapiro-Wilk statistical test was utilized. Between-group comparisons of qualitative characteristics were performed using Cochrane Q test ($\chi 2$). Besides, binary logistic regression was used to estimate the crude Odds Ratio (OR) between qualitative independent variables and the outcome variable; i.e., CAM utilization. An adjusted logistic regression model was also created using the variables whose significance level of crude OR was less than 0.2. Considering their well-known influence on CVD, gender, age, and Body Mass Index (BMI) were included in the regression model, regardless of their attributed OR values. All data analyses were performed using the SPSS software, version 22.0 (IBM Corporation, Armonk, NY).

Results

A total of 304 patients (194 men and 110 women) were recruited in this study. The frequency of patients identified as CAM users was 56.9% (n = 173). The participants' mean ± Standard Deviation (SD) of age and Body Mass Index (BMI) were 50.71 ± 9.75 years and 27.57 ± 3.34 kg/m^2, respectively. Additionally, 63.2% of the participants had an abnormal LVEF, 31% of them were in classes II and III based on NYHA functional classification, and 23.4% used implanted pacemakers. The mean duration of heart disease was 3.38 ± 3.64 years. The participants were also examined for three major CVD risk factors including diabetes, hypertension, and hyperlipidemia. The results indicated that 7.6% of the participants had all the three risk factors (Table 1). The prevalence of CAM utilization was also assessed among the participants with diabetes (55.9%), hypertension (59.8%), and hyperlipidemia (50.6%).

Variables included in the adjusted binary logistic regression model included gender, age, BMI categories, smoking status, alcohol consumption, NYHA classification, LVEF, implanted pacemaker, employment status, area of residence, and hospitalization history (Table 2). The results showed that the patients with implanted pacemakers were less likely to use CAM compared to the other patients (OR = 0.50, p = 0.031). Meanwhile, the likelihood of CAM utilization was approximately 2 and 4 times higher in the patients categorized in class I of the NYHA functional classification compared to those in the second and third classes, respectively. This value was also significantly higher in urban participants than in rural dwellers (OR = 1.80, p = 0.040) as well as in employees than in unemployed patients (OR = 2.50, p = 0.013). However, the likelihood of being a CAM user was not statistically affected by gender, age group, BMI, smoking, and alcohol consumption.

Praying for health and consumption of herbs were among the most common types of CAM used by the study participants (Table 3). Compared to other herbals, the prevalence of consumption of thyme (*Zataria multiflora* Boiss.) (61.3%), borage (*Borago officinalis* L.) (51%), and nettle (*Urtica dioica* L.) extract (26.6%) was higher among the CAM users. Table 4 provides information on other herbal medicine uses and ethnomedicinal recommendations. Homeopathy, chiropractic, spiritual therapy, and mental-training practices (except praying for health) were of no use to participants. We also found that the majority of CAM-users considered disease prevention as their main reason for their praying, herbal therapy, and supplement consumption. Meanwhile, TPM and acupuncture were more commonly used to treat acute and chronic illnesses, respectively (Figure 1).

The satisfaction level of CAM utilization varied depending on CAM types (Figure 2). We assessed the prevalence of high satisfaction levels among consumers of Borage (99%), Nettle extract (91.3%), and Thyme (64.2%). Among dietary supplements, vitamin C had the lowest, and vitamin B-complex had the

Table 1. Demographic characteristics of the participants with regard to CAM utilization

Variables		Total (n = 304) N (%)	Non-user (n = 131) N (%)	User (n = 173) N (%)	P value
Gender	Male	(63.8) 194	(67.2) 88	(61.3) 106	0.289
	Female	(36.2) 110	(39.1) 43	(38.7) 67	
Age (Year)	≥ 40	(17.8) 54	(16) 21	(19.1) 33	
	< to 50 40	(26) 79	(27.5) 36	(24.9) 43	0.745
	< 50	(56.3) 171	(56.5) 74	(54.1) 97	
BMI	Normal	(22) 67	(24.3) 42	(19.1) 25	
	Overweight	(54) 164	(48) 83	(68.8) 81	0.052
	Obese	(24) 73	(27.7) 48	(19.1) 25	
Education level	Illiterate	(18.1) 55	(18.3) 24	(17.9) 31	
	Diploma and below	(66.1) 201	(67.9) 89	(64.7) 112	0.693
	Academic	(15.8) 48	(13.7) 18	(17.3) 30	
Job Status	Unemployed	(25.7) 78	(31.3) 41	(21.4) 37	
	Self-employed	(47.3) 144	(50.4) 66	(45.1) 78	0.008**
	Employed	(27) 82	(18.3) 24	(33.5) 58	
Area of residence	Urban	(71.1) 216	(65.6) 86	(75.1) 130	0.071
	Rural	(28.9) 88	(34.4) 45	(24.9) 43	
Income	>Expenditure	(61.5) 187	(64.1) 84	(59.5) 103	0.416
	≤ Expenditure	(38.5) 117	(35.9) 47	(40.5) 70	
Smoking	No	(71.4) 217	(67.2) 88	(74.6) 129	0.158
	Yes	(28.6) 87	(32.8) 43	(25.4) 44	
Alcohol consumption	No	(65.1) 198	(60.3) 79	(68.8) 119	0.124
	Yes	(34.9) 106	(39.7) 52	(31.2) 54	
Implanted pacemaker	No	(76.6) 233	(69.5) 91	(82.1) 142	0.010*
	Yes	(23.4) 71	(30.5) 40	(17.9) 31	
NYHA class	I	(69.1) 210	(58) 76	(77.5) 134	
	II	(23.4) 71	(29.8) 39	(18.5) 32	0.001**
	III	(7.6) 23	(12.2) 16	(4) 7	
LVEF	Normal	(36.8) 112	(32.1) 42	(40.5) 70	
	Borderline	(56.6) 172	(60.3) 79	(53.8) 93	0.304
	Low	(6.6) 20	(7.6) 10	(5.8) 10	
Duration of disease	>years 5	(59.5) 181	(55.7) 73	(62.4) 108	0.238
	≤ years 5	(40.5) 123	(44.3) 58	(37.6) 65	
Simultaneous affliction with CVD risk factors"	None	(8.6) 26	(9.9) 13	(7.5) 13	
	I	(44.1) 134	(45) 59	(43.4) 75	0.019*
	II	(39.8) 121	(32.8) 43	(45.1) 78	
	III	(7.6) 23	(12.2) 16	(4) 7	
Hospital admission	No	(72.7) 221	(80.2) 105	(67.1) 116	0.011*
	Yes	(27.3) 83	(19.8) 26	(32.9) 57	

BMI: Body Mass Index, NYHA: New York Heart Association, CAM: Complementary Alternative Medicine, CVD: Cardiovascular Disease, LVEF: Left-ventricular Ejection Fraction
 # Major CVD risk factors were considered diabetes mellitus, hypertension, and hyperlipidemia.
** Difference was statistically significant at α level of 0.05.*
*** Difference was statistically significant at α level of 0.01.*

Table 2. The correlation between CAM utilization and different levels of socio-demographic parameters

Independent variable#	Crude OR (95% CI)	Adjusted OR (95% CI)	Adjusted P value*
Gender			
Male	1	1	
Female	1.29 (0.80, 2.08)	1.39 (0.82, 2.34)	0.224
BMI			
Normal	1	1	
Overweight	0.61 (0.34, 1.09)	0.63 (0.33, 1.21)	0.165
Obese	1.14 (0.57, 2.28)	1.12 (0.51, 2.44)	0.775
(Age (year			
< 40	1	1	
40 to 50	0.76 (0.38, 1.54)	1.02 (0.46, 2.27)	0.956
> 50	0.83 (0.45, 1.56)	0.96 (0.45, 2.03)	0.916
Area of residence			
Rural	1	1	
Urban	1.58 (0.96, 2.60)	1.80 (1.03, 3.16)	0.040*
Smoking			
No	1	1	
Yes	0.70 (0.42, 1.15)	0.92 (0.51, 1.67)	0.789
Alcohol consumption			
No	1	1	
Yes	0.70 (0.43, 1.11)	0.78 (0.45, 1.34)	0.365
Job status			
Unemployed	1	1	
Self-employed	1.31 (0.75, 2.27)	1.41 (0.76, 2.62)	0.269
Employed	2.68 (1.40, 5.13)	2.50 (1.21, 5.14)	0.013*
NYHA class			
I	1	1	
II	0.46 (0.27, 0.80)	0.53 (0.28, 0.98)	0.044*
III	0.25 (0.10, 0.63)	0.23 (0.08, 0.63)	0.005**
LVEF			
Normal	1	1	
Borderline	0.71 (0.43, 1.15)	0.89 (0.50, 1.59)	0.696
Low	0.60 (0.23, 1.56)	0.97 (0.30,3.17)	0.964
Implanted pacemaker			
No	1	1	
Yes	0.50 (0.29, 0.85)	0.50 (0.27, 0.94)	0.031*
Hospital admission			
No	1	1	
Yes	1.98 (1.16, 3.38)	3.21 (1.70, 6.06)	0.000**

CAM: Complementary Alternative Medicine, NYHA: New York Heart Association Functional Classification, LVEF: Left-ventricular Ejection Fraction # Logistic regression was used for Odds Ratio (OR) estimation

* Difference of OR was statistically significant at α level of 0.05 in comparison to the reference category.

** Difference of OR was statistically significant at α level of 0.05 in comparison to the reference category.

Table 3. Frequency of CAM types used by the CVD patients

CAM Type	Total (n = 173) N (%)	Male (n = 106) N (%)	Female (n = 67) N (%)	P-value
TPM remedies	45 (26)	29 (27.4)	16 (23.9)	0.611
Herbal therapy	160 (92.5)	91 (85.8)	53 (79.1)	0.247
Acupuncture	29 (16.8)	18 (17)	11 (16.4)	0.923
Dietary supplementation	106 (61.3)	65 (61.3)	41 (61.2)	0.987
Praying for health	163 (94.2)	97 (91.5)	66 (98.5)	0.091#

CAM: Complementary Alternative Medicine, TPM: Traditional Persian Medicine
Fisher's exact test

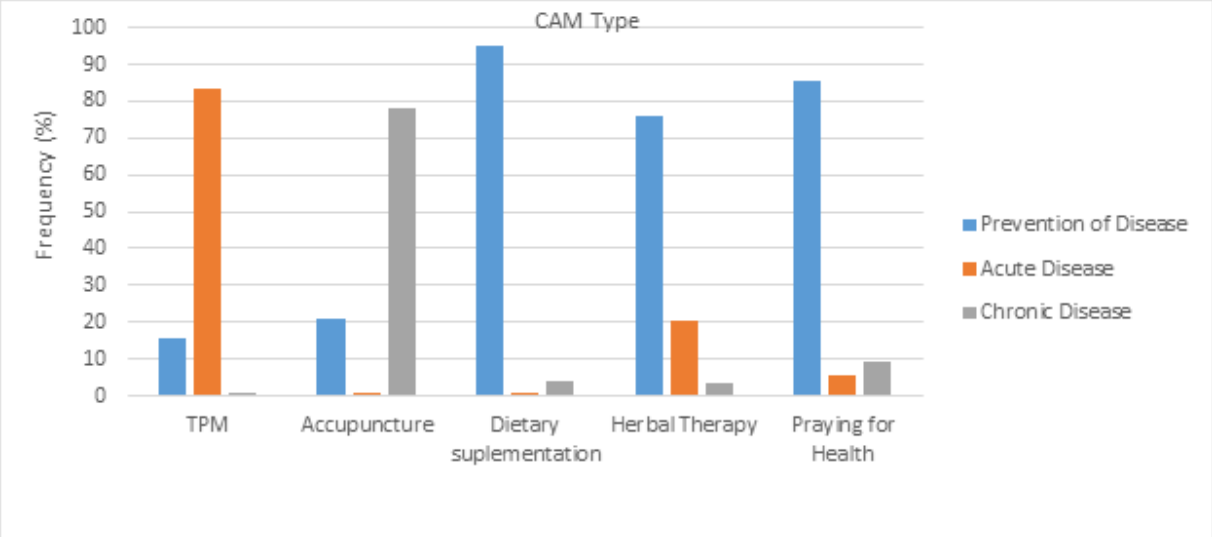

Figure 1. Reasons for CAM utilization in CVD patients

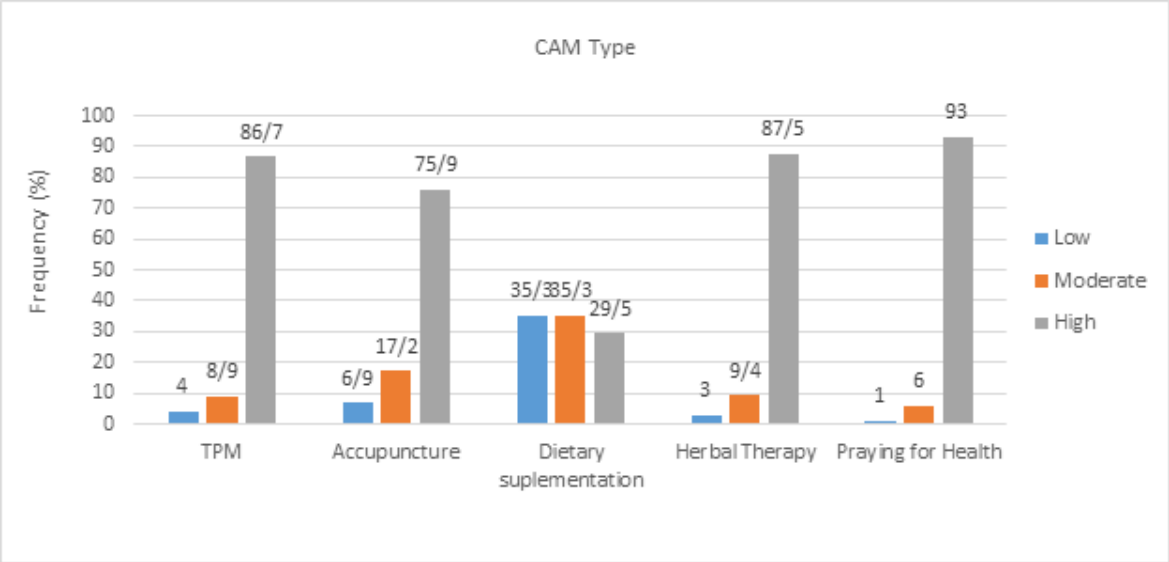

Figure 2. Satisfaction level with CAM utilization in the CVD patients

Table 4. The most common medicinal herbs taken by users and Ethno-medicinal recommendation

	Botanical name	Family	English name	Number(%)	Ethno-medicinal recommendation
1	*Zataria multiflora* Boiss.	Lamiaceae	Shirazi thyme	106(61.3%)	1. Antimicrobial [30] 2. Antioxidative [30] 3. Anti-inflammatory [30] 4. Spasmolytic [30] 5. Anti-nociceptive properties [30]
2	*Echium amoenum* Fisch. & C.A.Mey.	Boraginaceae	Borage	88(51%)	1. Nervousness and mild sedative [31] 2. Palpitation [31] 3. Common cold [31] 4. Stress [31] 5. Depression [31]
3	*Urtica dioica* L.	Urticaceae	Nettle	46(26.6%)	1. Improves heart health [32] 2. Improves gastrointestinal health [32] 3. Anti-diabetic effect [32] 4.Reduce inflammation [32]
4	*Camellia sinensis* (L.) Kuntze	Theaceae	Green tea	30(17.3%)	1. Cardioprotective [33] 2. Anti-obesity effects [33] 3. Gastroprotective effects [33] 4. Mood wellness [33] 5. Antidiabetic effects [33] 6. Anticancer effects [33]
5	*Lavandula angustifolia* Mill.	Lamiaceae	Lavender	22(12.7%)	1. Decrease systolic-diastolic blood pressure [34] 2. Decrease heart rate [34] 3. Decrease pain levels [34] 4. Anti-psoriatic [35] 5. Aroma [35]
6	*Cinnamomum verum* J.Presl	Lauraceae	Ceylon cinnamon, cinnamon	14(8.1%)	1. Anti-arrhythmia [36] 2. Antioxidant [36] 3. Anti-inflammatory [36] 4. Anti-atherosclerosis [36]
7	*Matricaria chamomilla* L.	Asteraceae	Chamomile (also spelled camomile)	9(5.2%)	1. Cardioprotective [37] 2. Hepatoprotective [37] 3. Nephroprotective [37] 4. Neuroprotective [37] 5. Antispasmodic [37] 6. Anticancer properties [37]
8	*Foeniculum vulgare* Mill.	Apiaceae	Fennel	7(4.1%)	1. Cardiovascular and lipid activity [38] 2. Antibacterial properties [38] 3. Antifungal activity [39] 4. Antioxidant activity [40] 5. Gastroprotective activity [38] 6. Diabetic prevention [41]
9	*Melissa officinalis* L.	Lamiaceae	Lemon balm	5(2.9%)	1. Anxiolytic and antidepressant properties [42] 2. Palpitation and arrhythmia [43] 3. Irritable bowel syndrome [44] 4. Insomnia [42] 5. Obesity [45]
10	*Zingiber officinale* Roscoe	Zingiberaceae	Ginger	2(1.1%)	1. Digestive stimulant [46] 2. Obesity [47] 3. Cardioprotective 4. Antidiabetic [48] 5. Cancer preventive [49,50]

highest level of satisfaction among CAM users, since 100% and 0% of the participants expressed dissatisfaction with their uses, respectively. About one-third of CAM users had no specialized information about their receiving CAM types, and less than 38% of them obtained their information from the Internet and cyberspace. Most CAM -users had consulted their physicians about the consequences of using CAM (Table 5).

Discussion

CAM has been widely used around the world, but there is a paucity of data on its use amongst CVD pa-

Table 5. Information sources and physicians' awareness of patients' CAM utilization

Variable	Total (n = 173) N (%)	Male (n = 106) N (%)	Female (n = 67) N (%)	P value
Source of information				
No information	54 (31.2)	35 (33.0)	19 (28.4)	0.778
Friends and family members	54 (31.2)	33 (31.1)	21 (31.3)	
Internet and cyberspace	65 (37.6)	38 (35.8)	27 (40.3)	
Pre-utilizing consultation by a physician				
No	77 (44.5)	45 (42.5)	32 (47.8)	0.494
Yes	96 (55.5)	61 (57.5)	35 (52.2)	
Prescription by a physician				
No	67 (38.7)	40 (37.7)	27 (40.3)	0.736
Yes	106 (61.3)	66 (62.3)	40 (59.7)	

tients. The present study findings showed that approximately 57% of the CVD patients had a recent history of CAM utilization. The patients with implanted pacemakers were less likely to use CAM compared to others. Meanwhile, the likelihood of CAM use in the patients in class I of the NYHA classification was approximately 2 and 4 times higher than that of the patients in the second and third classes, respectively. Herbs were among the most commonly used types of CAM in the study population. Thyme, borage, and nettle extract were the most popular herbals consumed by CAM users. The previous studies have reported similar prevalence rates of 56.2% [51] and 54% [52] for CAM utilization among CVD patients. However, a comprehensive systematic review showed that CAM utilization among cardiovascular patients varied from 4% to 61%, depending on the origin of the study population [7].

The most common CAM used by the study population in the current study was praying for health, herbal therapy, dietary supplementation, and TPM. In one study conducted in 2011, Hunt et al. found that aromatherapy, massage, acupuncture, and relaxation techniques were the most popular CAM types used in a British population [53]. Seemingly, cultural differences and religious tendencies are among the most influential factors affecting the popularity of CAM types in different countries.

The present study findings demonstrated that about 35% of the participants used dietary supplements such as vitamins and minerals. This finding was in line with a systematic review, which revealed that the prevalence of dietary supplementation varied between 26% and 42% in CVD patients [54]. In the current research, less than 15% of the participating CVD patients reported a history of referral to a traditional medicine specialist and 55.5% of the CAM users had consulted their physicians before CAM utilization. Similarly, a population-based survey in Australia revealed that 11% of the adult participants referred to a traditional medicine physician, half of whom had consulted their physicians before receiving CAM [55]. Moreover, the present study results indicated that the patients with cardiac pacemakers and those categorized in classes II and III of the NYHA functional classification used CAM less arbitrarily and commonly consulted their physicians before CAM therapy. In accordance with these findings, Prasad et al. disclosed that outpatient cardiovascular participants were more interested in using CAM treatments in comparison with hospitalized patients [56]. This finding probably indicates that patients with more complex conditions are more cautious about their behaviors in therapeutic interventions.

Although no similar studies were found on the relationship between CAM use and the severity of the disease in cardiovascular patients, this issue has been addressed in other populations. A previous study reported that the use of CAM increased with the severity of disease in patients with diabetes [57]. Similar findings were also obtained in patients suffering from asthma [58]. This might be due to different efficacies of CAM therapies, patients' satisfaction with conventional treatments, and common side effects of standard interventions that vary widely across diseases.

Among the types of CAM used by the population under the present investigation, the highest satisfaction was related to herbal therapy, especially thyme, borage, and nettle extracts. Similarly, a previous population-based research on depressed patients showed that the use of herbal medicines including chamomile, lavender, and borage was among the most common complementary therapies with moderate to high satisfaction levels [25]. However, a previous study demonstrated that nutritional supplementation, particularly mega-dose vitamin therapies, were the most common CAM type used by cardiovascular patients, with the prevalence rates of 40% and 35%, respectively [59].

The majority of CAM users participating in the present study used praying, herbal medicine, and dietary supplements to prevent diseases. Meanwhile, TPM and acupuncture were more commonly used to treat acute and chronic illnesses, respectively. In this regard, one study conducted on 150 Palestinian CHD patients found that about 50% of the study population used CAM to ameliorate their heart problems [60]. However, 7-82% of patients with heart failure tended to use CAM for disease treatment [61].

It is thought that cardiovascular patients are willing to use complementary medicine due to its low side effects compared to conventional treatments. Moreover, it seems that many patients use CAM on the assumption that government regulatory agencies monitor the safety of CAM products. Meanwhile, there is still no conclusive evidence about the effectiveness and safety of some types of CAM [54,62]. Although initial studies showed some benefits in CVD patients [63,64], several side effects have been reported for complementary therapies including hepatotoxicity, nephrotoxicity, interaction with conventional medications, hypersensitivity, and allograft rejection [59,65]. Therefore, more well-designed clinical trials are required to be conducted in future to determine the potential benefits and harms of CAM utilization.

Conclusion

This study showed that 56.9% of the CVD patients used CAM therapies. Praying for health, consumption of herbal medicines, and dietary supplementation were the most popular CAM types utilized by the study population. It was also observed that patients with advanced levels of CVD were more reluctant to utilize CAM. The highest satisfaction was with prayer for health, herbal medicine and TPM, respectively. The majority of CAM users consumed dietary supplements and used herbal therapy and praying to prevent disease, whilst Traditional Persian Medicine and acupuncture were more commonly used to treat acute and chronic illnesses, respectively. Considering the previously reported side effects, future investigations seem to be required to determine the exact physiologic impacts and long-term benefits and harms of CAM therapies in the population of cardiovascular patients.

Source of Funding

This work was supported by the Deputy of Research and Technology, Shiraz University of Medical Sciences, Shiraz, Iran.

Ethical Approval

This study was approved by the ethical committee of Shiraz University of Medical Sciences (ethics code: IR.SUMS.MED.REC.1400.189).

Conflict of Interests

Authors declare that there is no conflict of interest.

Acknowledgments

The authors of this manuscript wish to express their gratitude to Shiraz University of Medical Sciences, Shiraz, Iran.

References

[1] Naghavi M, Abajobir AA, Abbafati C, Abbas KM, Abd-Allah F, et al. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the global burden of disease study 2016. Lancet 2017;390:1151-1210.

[2] Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the global burden of disease study 2010. Lancet 2012;380:2095-2128.

[3] Roth GA, Abate D, Abate KH, Abay SM, Abbafati C, et al. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the global burden of disease study 2017. Lancet 2018;392:1736-1788.

[4] Kyu HH, Abate D, Abate KH, Abay SM, Abbafati C, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the global burden of disease study 2017. Lancet 2018;392:1859-1922.

[5] Gheorghe A, Griffiths U, Murphy A, Legido-Quigley H, Lamptey P, et al. The economic burden of cardiovascular disease and hypertension in low-and middle-income countries: a systematic review. BMC Public Health 2018;18:1-11.

[6] Sarrafzadegan N, Mohammadifard N. Cardiovascular disease in Iran in the last 40 years: prevalence, mortality, morbidity, challenges and strategies for cardiovascular prevention. Arch Iran Med 2019;22:204-210.

[7] Grant SJ, Bin YS, Kiat H, Chang DH-T. The use of complementary and alternative medicine by people with cardiovascular disease: a systematic review. BMC Public Health 2012;12:1-9.

[8] Abraham RR. Drug related problems and reactive pharmacist interventions for inpatients receiving cardiovascular drugs. Int J Basic Med Sci Pharm 2013;3:42-48.

[9] Najafpour Boushehri S, Karimbeiki R, Ghasempour S, Ghalishourani SS, Pourmasoumi M, et al. The efficacy of sour tea (Hibiscus sabdariffa L.) on selected cardiovascular disease risk factors: A systematic review and meta-analysis of randomized clinical trials. Phytother Res 2020;34:329-339.

[10] Prasad K, Prasad A, George M, Sandhu GS, Inojosa JRM, et al. Temporal trends in use of complementary therapies among patients with cardiovascular disorders. Am J Cardiol 2022;167:118-124.

[11] Smith BW, Dalen J, Wiggins KT, Christopher PJ, Bernard JF, et al. Who is willing to use complementary and alternative medicine? Explore 2008;4:359-367.

[12] Bodeker G, Ong C-K. WHO global atlas of traditional, complementary and alternative medicine: World Health Organization 2005.

[13] Jang A, Kang D-H, Kim DU. Complementary and alternative

medicine use and its association with emotional status and quality of life in patients with a solid tumor: a cross-sectional study. J Altern Complement Med 2017;23:362-369.
[14] Larijani B, Esfahani MM, Moghimi M, Ardakani MRS, Keshavarz M, et al. Prevention and treatment of flatulence from a traditional Persian medicine perspective. Iran Red Crescent Med J 2016;18:e23644.
[15] Tafazoli V, Tavakoli A, Mosaffa-Jahromi M, Cooley K, Pasalar M. Approach of Persian medicine to health and disease. Advances in Integrative Medicine. 2022;9:3-8.
[16] Shirbeigi L, Zarei A, Naghizadeh A, Vaghasloo MA. The concept of temperaments in traditional Persian medicine. Trad Integr Med 2017;2:143-156.
[17] Zohalinezhad ME, Zarshenas MM. Rhazes and an early case with possible hypertensive or reversible encephalopathy. J Hist Neurosci 2015;24:408-410.
[18] Zohalinezhad ME. Non-pharmacological treatment for heart condition in persian medicine. Adv Integr Med 2019;6:S127-S128.
[19] Che C-T, George V, Ijinu T, Pushpangadan P, Andrae-Marobela K. Traditional medicine. Pharmacognosy: Elsevier 2017; pp 15-30.
[20] Haghani F, Arabnezhad M-R, Mohammadi S, Ghaffarian-Bahraman A. Aloe vera and streptozotocin-induced diabetes mellitus. Rev Bras Farmacogn 2022;32:174-187.
[21] Organization WH. WHO global report on traditional and complementary medicine 2019: World Health Organization 2019.
[22] Zha W. Transporter-mediated natural product–drug interactions for the treatment of cardiovascular diseases.J Food Drug Anal 2018;26:S32-S44.
[23] Shaikh AS, Thomas AB, Chitlange SS. Herb–drug interaction studies of herbs used in treatment of cardiovascular disorders—A narrative review of preclinical and clinical studies. Phytother Res 2020;34:1008-1026.
[24] Bahall M. Complementary and alternative medicine usage among cardiac patients: a descriptive study. BMC Complement Altern Med 2015;15:100.
[25] Ashraf H, Salehi A, Sousani M, Sharifi MH. Use of complementary alternative medicine and the associated factors among patients with depression. Evid Based Complement Altern Med 2021;2021:6626394.
[26] Quandt SA, Verhoef MJ, Arcury TA, Lewith GT, Steinsbekk A, et al. Development of an international questionnaire to measure use of complementary and alternative medicine (I-CAM-Q). J Altern Complement Med 2009;15:331-339.
[27] Ruyvaran M, Salehi A, Fallahzadeh E, Vojoud M, Sharifi MH, et al. Traditional and complementary medicines usage and associated factors in gastrointestinal outpatients in Shiraz, Iran: a cross-sectional survey. Adv Integr Med 2021;8:285-291.
[28] Dolgin M, Dolgin M. The criteria committee of the New York heart association. Nomenclature and criteria for diagnosis of diseases of the heart and great vessels. 1994;253-256.
[29] Unkovic P, Basuray A. Heart failure with recovered EF and heart failure with mid-range EF: current recommendations and controversies. Curr Treat Options Cardiovasc Med 2018;20:1-11.
[30] Sajed H, Sahebkar A, Iranshahi M. Zataria multiflora Boiss. (Shirazi thyme)—An ancient condiment with modern pharmaceutical uses. J Ethnopharmacol 2013;145:686-698.
[31] Nouri M, Farajdokht F, Torbati M, Ranjbar F, Hamedyazdan S, et al. A close look at Echium amoenum processing, neuroactive components, and effects on neuropsychiatric disorders. Galen Med J 2019;8:e1559.
[32] Bhusal KK, Magar SK, Thapa R, Lamsal A, Bhandari S, et al. Nutritional and pharmacological importance of stinging nettle (Urtica dioica L.): A review. Heliyon 2022;e09717.
[33] Samanta S. Potential bioactive components and health promotional benefits of tea (Camellia sinensis). J Am Nutr Assoc 2022;41:65-93.
[34] Saritas SC, Buyukbayram Z, Serin EK, Bilgic Y. Effects of lavender oil intervention before endoscopic retrograde cholangiopancreatography on patients' vital signs, pain and anxiety: A randomized controlled study. Explore 2021;17:446-450.
[35] Silva LCdMA, de Oliveira Mendes FdC, de Castro Teixeira F, de Lima Fernandes TE, Ribeiro KRB, et al. Use of Lavandula angustifolia essential oil as a complementary therapy in adult health care: A scoping review. Heliyon. 2023;14:e15446.
[36] Christiany C, Sudrajat SE, Rahayu I. The potency of Cinnamomum zeylanicum to prevent diseases: a review. Eureka Herba Indonesia 2021;2:49-58.
[37] El Joumaa MM, Borjac JM. Matricaria chamomilla: A valuable insight into recent advances in medicinal uses and pharmacological activities. Phytochem Rev 2022;21:1913-1940.
[38] Noreen S, Tufail T, Badar Ul Ain H, Awuchi CG. Pharmacological, nutraceutical, functional and therapeutic properties of fennel (foeniculum vulgare). Int J Food Prop 2023;26:915-927.
[39] Olaru D, Popa EM. In vitro research on the inhibitory effects of fennel. sage and seabuckthorn essenmtial oils on some food spoilage fungi. Scientific Bulletin Series F Biotechnologies. 2019;23:87-90.
[40] Anka Z, Gimba S, Nanda A, Salisu L. Phytochemistry and pharmacological activities of Foeniculum vulgare. IOSR J Pharm 2020;10:1-10.
[41] Lavanya K. A review on anti-diabetic activity of medicinal spices. Int J Pharm Sci Rev Res 2021;69:72-76.
[42] Świąder K, Startek K, Wijaya CH. The therapeutic properties of Lemon balm (Melissa officinalis L.): Reviewing novel findings and medical indications. J Appl Bot Food Qual 2019;92:327-335.
[43] Alijaniha F, Naseri M, Afsharypuor S, Fallahi F, Noorbala A, et al. Heart palpitation relief with Melissa officinalis leaf extract: double blind, randomized, placebo controlled trial of efficacy and safety. J Ethnopharmacol 2015;164:378-384.
[44] Sadraei H, Ghannadi A, Malekshahi K. Relaxant effect of essential oil of Melissa officinalis and citral on rat ileum contractions. Fitoterapia 2003;74:445-452.
[45] Jafari F, Salehi-Abargouei A, Zare Sakhvidi MJ, Ranjbar AM, Zavar reza J, et al. Comparison of the effects of green tea and Melissa Officinalis on weight and blood pressure in welders: a single-blind, crossover clinical trial. J Nutr Food Secur 2018;3:130-138.
[46] Platel K, Srinivasan K. Digestive stimulant action of spices: a myth or reality? Indian J Med Res 2004;119:167.
[47] Srinivasan K. Ginger rhizomes (Zingiber officinale): a spice with multiple health beneficial potentials. PharmaNutrition 2017;5:18-28.
[48] Akash MSH, Rehman K, Tariq M, Chen S. Zingiber officinale and type 2 diabetes mellitus: evidence from experimental studies. Crit Rev Eukaryot Gene Expr 2015;25:91-112.
[49] Wang C-Z, Qi L-W, Yuan C-S. Cancer chemoprevention effects of ginger and its active constituents: potential for new drug discovery. Am J Chin Med 2015;43:1351-1363.
[50] Poltronieri J, B Becceneri A, M Fuzer A, Cesar C Filho J, Mar-

tin CB, et al. [6]-gingerol as a cancer chemopreventive agent: a review of its activity on different steps of the metastatic process. Mini Rev Med Chem 2014;14:313-321.

[51] Bahall M. Complementary and alternative medicine usage among cardiac patients: a descriptive study. BMC complement Altern Med 2015;15:1-8.

[52] Krasuski RA, Michaelis K, Eckart RE. The cardiovascular patient's perceptions of complementary and alternative medicine. Clin Cardiol 2006;29:161-164.

[53] Hunt KJ, Coelho HF, Wider B, Perry R, Hung S, et al. Complementary and alternative medicine use in England: results from a national survey. Int J Clin Pract 2010;64:1496-1502.

[54] Bin YS, Kiat H. Prevalence of dietary supplement use in patients with proven or suspected cardiovascular disease. Evid Based Complement Altern Med 2010;2011.

[55] Xue CC, Zhang AL, Lin V, Da Costa C, Story DF. Complementary and alternative medicine use in Australia: a national population-based survey. J Altern Complement Med 2007;13:643-650.

[56] Prasad K, Sharma V, Lackore K, Jenkins SM, Prasad A, et al. Use of complementary therapies in cardiovascular disease. Am J Cardiol 2013;111:339-345.

[57] Nahin RL, Byrd-Clark D, Stussman BJ, Kalyanaraman N. Disease severity is associated with the use of complementary medicine to treat or manage type-2 diabetes: data from the 2002 and 2007 National Health Interview Survey. BMC complement Altern Med 2012;12:1-17.

[58] Morgan W, Center H, Arms-Chavez C, LoBello SG. Complementary and alternative medicine use and asthma: relation to asthma severity and comorbid chronic disease. J Asthma 2014;51:333-338.

[59] Wood MJ, Stewart RL, Merry H, Johnstone DE, Cox JL. Use of complementary and alternative medical therapies in patients with cardiovascular disease. Am Heart J 2003;145:806-812.

[60] Salah AO, Salameh AD, Bitar MA, Zyoud SeH, Alkaiyat AS, et al. Complementary and alternative medicine use in coronary heart disease patients: a cross-sectional study from Palestine. BMC complement Med Ther 2020;20:1-14.

[61] Anderson JG, Taylor AG. Use of complementary therapies by individuals with or at risk for cardiovascular disease: results of the 2007 National Health Interview Survey. J Cardiovasc Nurs 2012;27:96.

[62] Tachjian A, Maria V, Jahangir A. Use of herbal products and potential interactions in patients with cardiovascular diseases. J Am Coll Cardiol 2010;55:515-525.

[63] Ai AL, Bolling SF. The use of complementary and alternative therapies among middle-aged and older cardiac patients. Am J Med Qual 2002;17:21-27.

[64] Liu EH, Turner LM, Lin SX, Klaus L, Choi LY, et al. Use of alternative medicine by patients undergoing cardiac surgery. J Thorac Cardiovasc Surg 2000;120:335-341.

[65] De Smet PA. The role of plant-derived drugs and herbal medicines in healthcare. Drugs 1997;54:801-840.