Original Research Article

Use of complementary and alternative medicine in general population during COVID-19 outbreak: A survey in Iran

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ABSTRACT

Objective: Some epidemic diseases such as coronavirus disease 2019 (COVID-19) have caused many physical, psychological, and social challenges, despite the existence of treatment strategies. Many people are looking for complementary and alternative medicine (CAM) to prevent such diseases. The present study was performed to determine how some types of CAM were being used during the COVID-19 epidemic in Iran.

Methods: The present study had a cross-sectional descriptive correlational design. All Iranian residents above 17 years old were eligible to participate in the study. A total of 782 participants completed a demographic information questionnaire, a questionnaire about their use of CAMs and a questionnaire about their satisfaction with the CAMs they used. Web-based sampling was conducted from 20 April 2020 to 20 August 2020.

Results: Of the participants, 84% used at least one type of CAM during the COVID-19 outbreak. The most used CAMs were dietary supplements (61.3%), prayer (57.9%), and herbal medicines (48.8%). The majority of the participants (50%–66%) have used CAMs to prevent the transmission of COVID-19 or to reduce anxiety caused by the COVID-19 pandemic. CAM use was associated with sex, having children, place of residence, COVID-19 status, and source of gathering information about CAM (P < 0.05). All 32 participants who had been infected with COVID-19 used at least one type of CAM for treatment or alleviation of the disease symptoms.

Conclusion: During the COVID-19 outbreak, some types of CAM, particularly nutritional supplements, medicinal herbs, and prayer, were commonly used to prevent COVID-19 and reduce pandemic-related anxiety.

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1. Introduction

Currently, the prevalence of epidemics, especially infectious viral diseases, is a serious threat to public health. New infectious diseases, such as swine influenza, avian influenza, and severe acute respiratory syndrome (SARS), have become more prevalent throughout the world in the last decade [1–3]. Coronavirus disease 2019 (COVID-19) is an acute respiratory disease whose signs and symptoms are not largely different from other respiratory viruses [4]. The respiratory symptoms of COVID-19 are similar to other respiratory infections and include cough, fever, lung damage and other mild to severe symptoms, such as fatigue, myalgia, and

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diarrhea [5,6]. The incubation period of the disease usually varies from 1 to 14 days. Individuals who have no symptoms or only very mild symptoms are considered to be carriers of the virus, and re-infection with COVID-19 is also possible [7]. COVID-19 affects many aspects of a patient's life, can have strong effects on patients suffering from pre-existing disease conditions [8], and has caused fear and panic in the society [9,10]. The latest statistics, from 30 June, 2021, reported a total of 181,521,067 COVID-19 infections and 3,937,437 deaths globally. The increasing rates of infection and death around the world show that COVID-19 is dangerous [11]; the World Health Organization (WHO) has declared the COVID-19 to be a pandemic disease [12].

Health protocols for people suspected of having COVID-19 include quarantine (in a separate room), admission to the hospital, and transfer of critical cases to the intensive care unit (ICU). In addition, patients with COVID-19 are treated in both general and specific (symptomatic) ways. General treatments include rest and supportive therapy, such as adequate fluid intake, maintenance of water-electrolyte balance, evaluation of vital signs and oxygen saturation, oxygen therapy, blood and urine tests [13]. Symptomatic treatments include the use of acetaminophen to control and reduce fever, oxygen therapy, use of drugs such as interferon-α which strengthens the immune system [14], luponavir and ritonavir [15], anti-influenza drugs, antibiotics, and glucocorticoids. Acutely or critically ill patients are also admitted to ICUs [13].

Literature has shown that in addition to the conventional therapies mentioned above, complementary and alternative medicines (CAMs) have been used to enhance the safety of people and to treat patients with viral infections, including COVID-19 [16–18]. According to the WHO's definition, CAM is the knowledge, skills, beliefs and indigenous experiences of different cultures that are used to maintain health, prevent, recover or treat physical and mental problems [19]. CAMs as different types of treatments and healthcare systems, are not currently defined as part of modern medicine, and they are divided into two classes: biologic therapies (such as herbal medicines, vitamin and dietary supplements) and non-biologic therapies (such as acupuncture, hydrotherapy, massage and music therapy) [20].

CAMs are important in the treatment of viral infections because, in addition to the lack of drugs available in modern medicine to treat these diseases, there are frequent changes in the antigen structure of respiratory viruses, especially in viruses containing RNA, so it is difficult to produce effective vaccines to fight them. As a result of the difficulty in fighting them, many people may die from viral respiratory diseases. Therefore, some studies have examined the use of CAMs and their effectiveness in preventing and treating viral respiratory diseases such as COVID-19 [21].

One study found that more than 85% of COVID-19 patients in China used traditional Chinese medicine (TCM) as a type of CAM. The results of one review showed that TCM enhanced the immune system, reduced the course of the disease and significantly reduced SARS-related mortalities. The study emphasized that TCM could be effective in preventing and treating the COVID-19 because of the similarity of SARS and COVID-19 [22]. The results of two studies showed that the genomic sequence of the COVID-19 virus was 79.5% similar to that of the SARS virus [22,23]. A study also introduced approximately 40 kinds of TCMs for the treatment of influenza and SARS [3].

Based on the results of the literature review, it seems that people who are at risk of highly contagious diseases, including COVID-19, tend to use complementary medicines to prevent them. However, few studies are available in this area. The present study investigated the use of some types of CAM for the prevention of the COVID-19 in Iran.

2. Method

2.1. Study design and setting

This cross-sectional descriptive correlational study aimed to determine the role of CAM in the prevention of COVID-19 in Iran during the COVID-19 outbreak. The research setting included all provinces of Iran. According to the latest September 6, 2020 statistics from the Ministry of Health of Iran, 388,810 were reported as positive cases of COVID-19; of these, 22,410 patients died.

2.2. Sampling and sample size

Data were collected via online questionnaires in social networks (WhatsApp, Telegram, ETA, and I-Gap) using convenience method. The electronic form of the questionnaires was designed using online Press Line software and uploaded on the internet and virtual networks. Inclusion criteria were all Iranians with 17 or more years of age, who had access to social networks and the internet. The sample size was calculated for an unlimited population using Cochran's formula for categorical data:

$$n = \frac{Z^2 pq}{d^2}$$

where $Z = 1.96$, $p = q = 0.5$, and d = the study's acceptable margin of error 0.04. We calculated that the necessary sample size for this study would be 600 participants.

2.3. Ethical issue

The ethics committee of Kerman University of Medical Sciences approved the study protocol (IR.KMU.REC.1399.056). An informed consent form was placed at the beginning of the electronic form. The objectives of the study, the confidentiality and anonymity of the information were explained, and participants were free to complete the questionnaire. We obtained written informed consent from the participants by inserting the consent on the first page of the online questionnaire.

2.4. Questionnaires

Data were collected with three questionnaires. A: demographic information questionnaire; B: CAM questionnaire; C: satisfaction with the use of complementary medicine questionnaire.

2.4.1. Demographic information questionnaire

The demographic information questionnaire included age, gender, marital status, number of children, place of residence, level of education, occupation, history of underlying disease, screening for COVID-19, source of information, and history of addiction.

2.4.2. CAM questionnaire

The CAM questionnaire used in this study was developed by Ghaedi et al. [24] in Iran in 2017. The validity of this questionnaire in previous studies was obtained by using face and content validities and its internal reliability was 0.77–0.85 by using Cronbach's α coefficient [24–26]. It included seven items related to various types of CAM: medicinal plants, dry cupping, wet cupping, massage, dietary supplements, and various relaxation techniques such as yoga, prayer, and *Nazr*. In Islam, *Nazr* is a vow or commitment to carry out an act. The failure to fulfill the commitment results in the need to take a compensating action, often of a charitable nature, such as feeding the poor. The reasons for using each of these CAMs and any physician's advice were also assessed. An open-ended question

about the existence of other types of CAM was asked at the end of the questionnaire.

The use of CAM was determined using questions with "yes" or "no" responses; if "yes" was indicated, the frequency of CAM use was determined using a five-point Likert scale (from rarely to every day). Reasons for using CAMs were also measured through three items: COVID-19 prevention, reduction of anxiety and stress caused by the COVID-19 pandemic, and "other." One item was whether to consult a doctor/healthcare staff to use complementary medicine.

2.4.3. Satisfaction with the use of complementary medicine questionnaire

This questionnaire consisted of following items concerning access to a CAM modality: its ease of use, harmlessness, non-interference with daily activities, reduction of physical and mental symptoms caused by COVID-19, no drug interaction, recommendation of the method to others, and its cheapness. A five-point Likert scale, ranging from "strongly agree" to "strongly disagree", was used. The minimum score of this questionnaire was nine and the maximum was 45, with higher scores reflecting more satisfaction with the use of CAM. The validity of this questionnaire in previous studies was obtained by using face and content validities and its internal reliability was 0.77–0.85 by using Cronbach's α coefficient [24–26].

2.5. Data collection

The electronic form for the demographic information questionnaire and the researcher-developed CAM questionnaire was designed with the help of a computer expert. Objectives of the study, informed consent, and confidentiality of information were explained at the beginning of the online questionnaire. To complete the questionnaire, participants had to express their consent to participate in the project.

The research team tested and controlled the efficiency and responsiveness of this questionnaire. An online questionnaire was tested on 50 citizens to assess the engagement of individuals in completing the questionnaire. Data were collected from April 20, 2020 to August 21, 2020. Since the option of "If participants do not respond to all questions, they will not be allowed to submit the questionnaire" was marked on the webserver; no questionnaire was excluded due to missing value and the effective response rate was 100%.

2.6. Data analysis

Data from this study were analyzed using SPSS statistics software (version 25.0, IBM Corp, Armonk, NY, USA). Descriptive statistics (frequency, percentage, mean and standard deviation) were used to describe demographic characteristics, while chi-squared

Table 1
Demographic characteristics of the participants and demographic differences between CAM users and non-users.

Variable	Frequency (%)	CAM user		Chi-squared test statistic	P value
		Yes (n [%])	No (n [%])		
Age (year)				3.79	0.150
< 30	399 (51.0)	326 (81.7)	73 (18.3)		
30–40	254 (32.5)	217 (85.4)	37 (14.6)		
> 40	129 (16.5)	114 (88.4)	15 (11.6)		
Gender				23.21	< 0.001
Female	521 (66.6)	461 (88.5)	60 (11.5)		
Male	261 (33.4)	196 (75.1)	65 (24.9)		
Marital status				9.45	0.002
Single/divorced	377 (48.2)	301 (79.8)	76 (20.2)		
Married	405 (51.8)	356 (87.9)	49 (12.1)		
Having children				9.97	0.002
No	457 (58.4)	368 (80.5)	89 (19.5)		
Yes	325 (41.6)	289 (88.9)	36 (11.1)		
Province*				24.88	< 0.001
First region	57 (7.3)	54 (94.7)	3 (5.3)		
Second region	240 (30.7)	195 (81.3)	45 (18.8)		
Third region	26 (3.3)	22 (84.6)	4 (15.4)		
Fourth region	33 (4.2)	19 (57.6)	14 (42.4)		
Fifth region	426 (54.5)	367 (86.2)	59 (13.8)		
Education level				5.44	0.250
Middle/high school	28 (3.6)	21 (75.0)	7 (25.0)		
Diploma	152 (19.4)	121 (79.6)	31 (20.4)		
Bachelor	412 (52.7)	355 (86.2)	57 (13.8)		
Master	144 (18.4)	122 (84.7)	22 (15.3)		
MD/PhD	46 (5.9)	38 (82.6)	8 (17.4)		
Occupation				3.13	0.210
Employed	470 (60.1)	393 (83.6)	77 (16.4)		
Retired	12 (1.5)	8 (66.7)	4 (33.3)		
Unemployed/housewife	300 (38.4)	256 (85.3)	44 (14.7)		
Chronic disease				2.32	0.130
Yes	72 (9.2)	65 (90.3)	7 (9.7)		
No	710 (90.8)	592 (83.4)	118 (16.6)		
Addicted to drugs				5.63	0.020
Yes	16 (2.0)	10 (62.5)	6 (37.5)		
No	766 (98.0)	647 (84.5)	119 (15.5)		

* First region: Tehran, Qazvin, Mazandaran, Semnan, Golestan, Alborz, and Qom Provinces; second region: Isfahan, Fars, Bushehr, Chaharmahal Bakhtiari, Hormozgan, and Kohgiluyeh and Boyer-Ahmad Provinces; third region: East Azerbaijan, West Azerbaijan, Ardabil, Gilan, Kurdistan, and Zanjan Provinces; forth region: Kermanshah, Ilam, Lorestan, Hamedan, Markazi, and Khuzestan Provinces; fifth region: South Khorasan, North Khorasan, Razavi Khorasan, Kerman, Yazd, Sistan and Baluchestan Provinces.

Table 2
The participants' responses to some coronavirus disease questions and sources of information and their differences between CAM users and non-users.

Variable	Frequency (%)	CAM user		Test statistic	P value
		Yes (n/%)	No (n/%)		
Screening for COVID-19					
Yes	467 (59.7)	410 (87.8)	57 (12.2)	12.33	< 0.001
No	315 (40.3)	247 (78.4)	68 (21.6)		
History of being infected with COVID-19					
Yes	32 (4.1)	32 (100)	0 (0)	6.35*	0.006
No	750 (95.9)	625 (83.3)	125 (16.7)		
Radio and television					
Yes	303 (38.7)	259 (85.5)	44 (14.5)	0.79	0.380
No	479 (61.3)	398 (83.1)	81 (16.9)		
Book					
Yes	50 (6.4)	41 (82.0)	9 (18.0)	0.16	0.690
No	732 (93.6)	616 (84.2)	116 (15.8)		
Social networks and internet					
Yes	537 (68.7)	452 (84.2)	85 (15.8)	0.03	0.860
No	245 (31.3)	205 (83.7)	40 (16.3)		
Medical staff					
Yes	82 (10.5)	68 (82.9)	14 (17.1)	0.08	0.780
No	700 (89.5)	259 (84.1)	111 (15.9)		
Friends					
Yes	248 (31.7)	222 (89.5)	26 (10.5)	8.18	0.004
No	534 (68.3)	435 (81.5)	99 (18.5)		
Satellite					
Yes	30 (3.8)	24 (80.0)	6 (20.0)	0.38	0.540
No	752 (96.2)	633 (84.2)	119 (15.8)		
Others					
Yes	38 (4.9)	31 (81.6)	7 (18.4)	0.18	0.670
No	744 (95.1)	626 (84.1)	118 (15.9)		

* Fisher's exact test, for others chi-squared test.

test, Fisher's exact test and multivariate logistic regressions were used to examine correlations between the CAM and non-CAM users and qualitative variables. One-way analysis of variance was used to determine the level of satisfaction with CAM use. A threshold of $P \leq 0.05$ was used for statistical significance.

3. Results

3.1. Demographic characteristics of participants

Seven hundred and eighty-two individuals completed the online questionnaire. The mean age of the participants was (31.05 ± 9.12) years (17–63). Most of the participants were female (66.6%), married (51.8%), and employed (60.1%). Most of the participants had no chronic disease (90.8%) and were not addicted to drugs (98.0%; Table 1).

3.2. Participants' responses to some coronavirus disease questions

More than half of the participants had participated in the COVID-19 screening program of the health ministry. Only 4.1% of the participants were infected with COVID-19. Among the different sources of information, most participants used social networks and the internet for acquiring information about CAM and the COVID-19 (Table 2).

3.3. CAM uses during COVID-19 outbreak

Overall, 84% (n = 657, 95% confidence interval = 81.3–86.4) of the participants had used at least one type of CAM during the COVID-19 outbreak. In addition, 24.5% (n = 161) of the participants had used only one type of CAM, while 34.7% (n = 228) had used two types of CAM, 27.9% (n = 183) had used three types of CAM, and 12.9% (n = 85) had used four to six types of CAM during the COVID-19 outbreak. Approximately 61% of participants used nutri-

tional supplements such as vitamin D, vitamin C, multi-vitamin, and others, including vitamin B6, vitamin B complex, vitamin E, zinc, calcium, iron, omega-3, and folic acid, or a combination of supplement (Fig. 1). A total of 57.9% of the participants used prayer, while 48.8% used medicinal herbs, such as chamomile, thyme, ginger, mint, cinnamon, Imam Kazim medicine (a mixture of myrobalan, fennel, and brown sugar), hollyhocks, lavender, pennyroyal, buttercup, jujube, rosemary, viper's-buglosses, fennel, and a mixture of apple cider vinegar and honey, 11.6% used massage, 11.1% used relaxation, 3.5% used wet cupping, and 2.4% used dry cupping (Table 3).
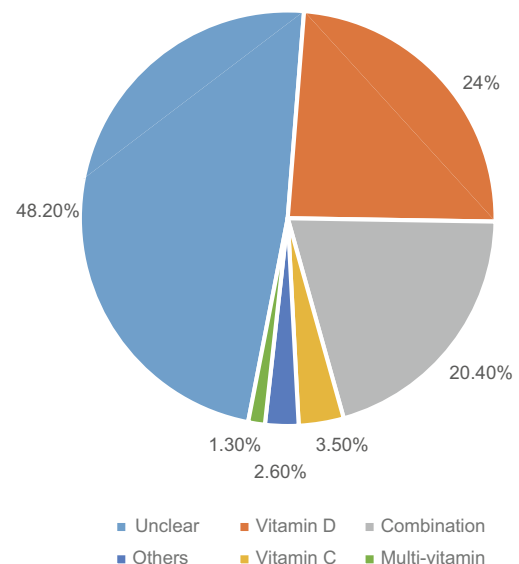

Fig 1. The prevalence of using different types of nutritional supplements during COVID-19 outbreak.

Table 3
Use of the CAMs in general population during the COVID-19 outbreak and the reasons for using each type of CAMs.

Variable	Frequency of the users (%)	Confidence interval of percentage (%)	Reasons for using the CAM methods (n [%]*)			
			Preventing infection with COVID-19	Reducing anxiety of COVID-19	Both**	Others
Medicinal herbs	382 (48.8)	45.1–52.6	152 (43.2)	61 (17.3)	55 (15.6)	84 (23.9)
Nutritional supplements	479 (61.3)	57.5–64.8	194 (52.0)	24 (6.4)	32 (8.6)	123 (33.0)
Dry cupping	19 (2.4)	1.4–3.6	7 (38.9)	2 (11.1)	2 (11.1)	7 (38.9)
Wet cupping	27 (3.5)	2.3–4.7	11 (55.0)	2 (10.0)	1 (5.0)	6 (30.0)
Massage	91 (11.6)	9.5–14.1	14 (18.4)	32 (42.1)	3 (3.9)	27 (35.5)
Relaxation and meditation	87 (11.1)	8.8–13.4	6 (8.8)	39 (57.4)	9 (13.2)	14 (20.6)
Prayer	453 (57.9)	54.7–61.6	66 (18.4)	154 (42.9)	73 (20.3)	66 (18.4)

* Percentage of "yes";
** preventing infection with COVID-19 and reducing anxiety of COVID-19; others: treatment of coronavirus disease, decreasing disease symptoms, strengthening the immune system, and decreasing fatigue.

Table 4
The logistic model of important variables.

Variable	Multivariate logistic regression		
	Odds ratio	Confidence interval	P value
Gender			
Male	1.00 (referent)	/	
Female	2.96	1.96–4.47	< 0.001
Having child/children			
No	1.00 (referent)	/	
Yes	1.67	1.06–2.62	0.030
Province			
Fifth	1.00 (referent)	/	0.004
Fourth	0.31	0.14–0.69	0.004
Third	1.09	0.35–3.44	0.880
Second	0.76	0.48–1.20	0.240
First	4.04	1.18–13.83	0.260
Screening for COVID-19			
No	1.00 (referent)	/	
Yes	2.04	1.35–3.08	0.001
Friends as a source of information			
No	1.00 (referent)	/	
Yes	1.95	1.20–3.16	0.007

In addition, 19.83% of the participants (n = 95) used nutritional supplements at least once a week, 24.61% of them (n = 94) used medicinal herbs at least once a week, 17.58% (n = 16) used massage at least once a week, 24.14% (n = 21) used relaxation techniques at least once a week, and 10.53% (n = 2) used dry cupping at least once a week. Furthermore, 66.44% (n = 301) of the participants used prayer daily and 81.48% (n = 22) of them used wet cupping once a month.

Fifty-five percent of the participants consulted a physician before using dietary supplements. However, only 33.3% and 23.2% of the participants consulted a physician whether to use wet cupping or medicinal herbs, respectively.

The multivariate logistic regression with conditional backward elimination showed that among important variables (variables that had a P value < 0.2 in the bivariate analysis), the CAM use was associated with gender, having children, place of residence,

screening for COVID-19, and friends as a source of information (Table 4). It is noteworthy that all participants infected with COVID-19 used CAM; therefore a history of COVID-19 infections was not included in the multivariate logistic regression model.

3.4. Satisfaction with the use of complementary medicine

Furthermore, the mean score of satisfaction with use of the CAM was 34.04 ± 5.77, which was higher than the midpoint of the questionnaire (27.00). The mean score of satisfaction was significantly different among participants who used different kinds of CAMs (Table 5). On the other hand, participants who used three (P = 0.007), or four to six types (P < 0.001) of CAMs had higher level of satisfaction compared with participants who used only one type of CAM.

4. Discussion

The use of CAM has been considered in the context of the prevalence of COVID-19 worldwide and the need to maintain the health of individuals. A study conducted in 32 different countries has shown that about 24.5% of adults are using traditional CAM (TCAM) [27]. The present study investigated the use of some types of CAM for the prevention of COVID-2019 in Iran.

The results of the present study showed that, in general, many participants used at least one type of CAM during the COVID-19 outbreak. In addition, 24.5%–34.7% of the participants have used one or more types of CAM. Only 4.1% of the participants had been infected with COVID-19. These results indicated that people used CAM more to prevent COVID-19 and reduce COVID-19-related anxiety, and all people with COVID-19 used CAM to treat and improve the symptoms of the disease.

Special attention has been paid to the use of traditional medicine in China during the COVID-19 outbreak. The National Health Committee of China has issued a project called "Diagnosis and Treatment of New Coronavirus Pneumonia (COVID-19)." The project emphasizes the combination of Chinese and Western medicines in the diagnosis and treatment of COVID-19; in particular it

Table 5
The satisfaction with use of the CAM.

Variable	Satisfaction with use of the CAM			Analysis of variance	P value
	Median	Mean	Standard deviation		
User of one type of CAM	32	32.05	6.33	6.60	< 0.001
User of two types of CAMs	34	33.90	5.65		
User of three types of CAMs	36	34.55	5.49		
User of four to six types of CAMs	36	35.87	5.13		

emphasizes the role of Chinese medicine, and provides online TCM advice for COVID-19 patients [28]. The present work, to the best of our knowledge, is the first study in Iran that investigated the use of CAM during the COVID-19 pandemic. The results of the present study have been compared with similar epidemics and previous studies, as there are no data from the present outbreak with which to compare ours.

TCM has been used for hundreds of years to prevent and alleviate epidemic diseases. A combination of TCM and Western medicines can be used to reduce fever, cough, fatigue, diarrhea, lung exudation and other mild symptoms in patients with COVID-19, which can prevent further progression of the disease [28]. The meta-analysis by Liu et al. [17] evaluated the effects of Chinese herbal medicine (eight randomized controlled trials) on SARS, finding that it was able to significantly reduce the mortality rate, duration of fever, symptoms, chest radiographic abnormalities, and secondary fungal infections in patients. These results suggest that the combination of Chinese herbal medicines with modern medicines may be beneficial for patients with SARS. In Korea, Hwang et al. [29] found that 76.1% of the participants used one or more types of CAM during the Middle East respiratory syndrome (MERS) outbreak. Recently, Ghaedi et al. [24] in Iran showed that the use of CAM was increasing, especially in patients with chronic diseases, and 75.4% of people used at least one type of CAM. According to Ghaedi et al. [24], cold (32.9%) was the most common reason for using CAM.

In the present study, prevention of infection and reduction of anxiety were important reasons for CAM use. However, a review of the literature showed that studies have not addressed the reasons for the use of CAMs in communities during the COVID-19 outbreak. Charan et al. [30] showed that 25.8% of the COVID-19 patients used CAM and home remedies during and after treatment, and nearly half of the participants consumed Ayurvedic Kadha. However, the reasons for use of CAM were not mentioned. Konakci et al. [31] examined CAM methods in the treatment of coronavirus disease and indicated reasons for the use of CAM, but did not indicate an increase in the use of CAM for the treatment of COVID-19. The reasons for use of CAM depend on culture and social status and require further investigation.

In the present study, 48.8% of the participants reported using medicinal plants, and preventing infection with COVID-19 was the most important reason for their use. During the COVID-19 pandemic, El Alami et al. [32] showed that a total of 23 medicinal plant species belonging to 11 botanical families were used, and the most important families were Lamiaceae, Cupressaceae and Zingiberaceae. A review of the literature shows that CAM has been used in many countries during epidemics similar to COVID-19, including influenza. Some CAMs, including Shufeng Jiedu and Lianhua Qingwen capsules, Maxing Shigan extract, Yinqiao powder, and Jinhua Qinggan granules have been effective in treating influenza [3]. Sheikhrabori et al. [33] reported that 77.4% of outpatients used medicinal plants, and colds (31.8%) were the most common clinical symptoms leading to the use of CAMs. Consistent with the results of the present study, Ghaedi et al. [24] showed that most of the participants (69.4%) used medicinal plants. However, the two studies [24,33] did not mention the type of herbal medicines used by individuals. Sheikhrabori et al. [33] showed that the most important reasons for using herbal medicines were ease of use, safety of medicinal plants, satisfaction with symptom relief, and lack of worry about drug interactions; about 92.3% felt well after using herbs and 86.1% recommended herbs to others. Abundance and ease of use are the top reasons why patients choose herbal medicines over other CAM methods. It also seems that Iranian people are more inclined to use and trust herbal medicines. Other reasons for using herbal medicines have been the lack of knowledge of herbal medicine consumers about possible toxicity [34]. However, previ-

ous studies have associated cardiac arrhythmia [35] and hepatic failure [36] to the use of herbal medicines. The availability of CAM treatments is another important factor in their use. Krug et al. [37] showed that culture and tradition as well as differences in public health systems had significant effects on the acceptance of the herbal medicines. Dastgheib et al. [38] found that 89.9% of the patients with skin problems such as acne and alopecia used herbal medicines and the average duration of their illnesses were significantly longer. This result indicated that the type and the course of the disease are other reasons that may affect the use of CAMs. Furthermore, Peltzer et al. [27] showed that variables, such as poor health, depression and a chronic illness or disability, were associated with TCAM use. The use of natural products and herbal medicines for prevention is a serious approach to stop or at least reduce the speed of SARS-CoV-2 transmission [39].

Approximately 61% of the participants in the present study used dietary supplements like vitamins and minerals. Nilashi et al. [40] showed that the use of CAM could be an effective way to enhance the immune response to infections, and the use of vitamins such as vitamins D3 (400 IU) and C was effective for improving health and function of the immune system against infectious diseases and COVID-19. Hwang et al. [29] showed that easy-to-access methods such as multivitamins and food products were the most popular during the MERS epidemic, and the use of CAM also varies in the study population.

Approximately 58% of the participants in the present study have used prayer. Since Iranian people are muslim, they pay especial attention to prayer and spiritual healing. Therefore, in Iran, the use of prayer and spiritual healing is anticipated in stressful circumstances. Furthermore, Dehghan et al. [25] showed that 71.8% of infertile couples in Iran used prayer and 70.2% of them used *Nazr* as a part of their healthcare. Alyousefi et al. [41] studied the prevalence of CAM among Saudis and showed that spiritual acts such as prayer and Qur'an (varying between 9% and 95%) were higher than other types, including medicinal plants (8%–76%), honey (14%–73%), and other food products (6%–82%).

The prevalence of wet cupping and dry cupping in the present study was 3.5% and 2.4%, respectively. A study on smokers with chronic obstructive pulmonary disease showed that wet cupping stimulated persistent O_2 saturation for up to 12 hours after treatment, and participants expressed vitality and improved breathing following the therapy [42]. In addition, Alyousefi et al. [41] showed that Saudis rarely used wet cupping (*Alhijamah*) (4%–45%), indicating that the use of some different methods of CAM according to culture, customs and religious beliefs.

Fifty-five percent of the participants in the present study consulted a physician about whether to use dietary supplements. Only 33.3% and 23.2% of the participants consulted a physician whether to use wet cupping and medicinal plants, respectively, indicating a high level of self-medication. In Iran, Azami-Aghdash et al. [43] reviewed 25 articles and showed a relatively high prevalence of self-medication in Iranian society, and compared with other countries, patients with respiratory diseases were the most prominent group who used self-medication. Nakhaee et al. [44], in a review of 19 articles, found that 41% of the Iranian people mostly used self-medication for colds. These results show a high level of self-medication for respiratory diseases; increasing public awareness of potential complications from herbal products could help to reduce the prevalence of self-medication. People should be also trained to consult with a doctor when selecting non-prescription medicines.

The use of CAM in the present study had a significant positive correlation with gender (women used CAMs more than men), having children (participants with children used CAMs more than those without), province (participants who live in the fourth region of Iran, i.e., Kermanshah, Ilam, Lorestan, Hamedan, Markazi, and

Khuzestan Provinces, used CAMs less than those who live in other regions), COVID-19 screening (participants who had positive COVID-19 tests used CAMs more than those who had not) and friends as a source of information (participants who relied on their friends for information about CAMs used CAMs more than those who did not). Stewart et al. [45] showed that the consumption of minerals and medications was the most common CAM used by women. Other studies [38,46] supported this finding. However, Krug et al. [37] found that people with higher education had a higher use of CAMs, while people with respiratory problems rarely used CAMs (7.8%–19.9%). Peltzer et al.'s study [27] covering 32 countries showed that the use of TCAM was associated with middle age, female gender, lower education level, no religious affiliation, lower economic indicators and a positive attitude towards TCAM. These results show the wide use of CAM in different cultures and various reasons influencing its use.

In contrast, Jang et al. [20] showed that cancer patients who were younger, more educated and wealthier, had more advanced stages of cancer, and were less likely to consult with a physician about their CAM use were more associated with consumption of CAM. Different results could be due to the specific and acute effects of cancer on patients. In addition, Ghaedi et al. [24] showed that the use of CAM among people with higher education was 3.22 times greater than among the uneducated population. These results highlight the need for further studies on the types of CAM used, and methods of assessment and attention to the context of society in the use of CAM methods.

Among the various sources of information, most of the participants in the present study used social networks and the internet to obtain information about CAM and COVID-19. Hwang et al. [29] observed that most of the CAM users used mass media (52.4%) and the internet (27.4%) to obtain information about CAM during the MERS epidemic. In contrast, James et al. [47] showed that family (62%) and friends (23.3%) were the usual sources of TCAM information during the Ebola epidemic. Regarding the high use of CAM during the outbreak of epidemics such as COVID-19 and MERS, it is important to pay attention to the role of mass media in order to provide reliable information for the safety of CAM consumers.

5. Limitations

Although our study examined a wide range of information on the use of CAMs, the results should be carefully considered, and further investigation is required. In addition, methodological differences such as sampling, target population and the type of questionnaire were important limitations to consider when measuring and reporting the use of CAM methods. Another issue was the use of electronic questionnaires, which did not evenly sample the population. Individuals who were illiterate or did not have access to the internet and social networks, were under-represented by these methods, making it difficult to generalize the results, and demanding the repetition of the study to include communities with different education levels and media access.

6. Conclusion

CAM is widely used in Iran. Dietary supplements, medicinal plants and prayers were the most used CAM methods during the outbreak of COVID-19. Further research is needed to identify the factors affecting CAM use. Mass media could play an important role in people's knowledge and awareness of different CAM methods and their uses.

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