

Complementary and alternative medicine during COVID-19 pandemic in Jordan: a cross-sectional study

Abstract

Introduction: Complementary and alternative medicine (CAM) is widely used among people around the world. In this study, we investigate Jordanian attitude toward CAM in COVID-19 pandemic.

Methods: For the purpose of our research, we decided to use a cross-sectional questionnaire-based method. Questionnaires were chosen because of their reliability and quickness in collecting the primary data we needed from multiple participants. The questionnaire was conducted in August 2021 over a duration of approximately 10 days. Participants were recruited by online social media platforms to share with us their experiences in their illness of COVID-19 disease. The questionnaire that was used in the current study is based on review of similar literatures and discussion within research members. Statistical analysis was performed using SPSS version 26. Frequency distribution and descriptive data were produced.

Results: A total of 680 responses for the Survey. 613 (90.1%) of 680 persons have used CAM during their illness of COVID 19, whereas 67 (9.9%) haven't used it. Most of the participants 624(91.8%) had a belief in alternative medicine but 56(8.2%) didn't believe in it at all. The study shows that Jordanians have used CAM for many targets such as promoting health 152(24.7%), preventing illness 21(3.4%), treating disease 170(27.7%) and other multiple reasons 277(44%). The reasons of their belief or use vary, 300 persons used it for cultural tradition, 160 for religious tradition and 164 had other reasons too. Among the users, 390(63.6%) have used them with medicinal drugs and 223(36.4%) have used them without any drug. The use of alternative medicine had a self-reported positive effect in decreasing the symptoms in 566 participants (92.3%). The most used remedies were vitamin C supplements (510, 83.1%), lemons (506, 82.5%), Zinc (371, 60.5%), honey (335, 54.2%), and Ginger (333, 54.6%).

Conclusions: CAM has been significantly used by Jordanians in COVID-19 pandemic. According to our study, Jordanians highly believe in CAM because of cultural traditions, religious traditions, and other causes. Despite of this, the study showed that more than half of participants have used it along with medicinal drugs. The most used remedies were Vitamin C, Lemon, Zinc, honey, Ginger, Vitamin D, Anise, onion, Garlic, and Chamomile. Meanwhile, CAM has been associated with positive self-reported improvement of symptoms and this could be due to anti-inflammatory, anti-infectious, or immunity-enhancing properties of these supplements and herbs.

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Introduction

The COVID-19 pandemic affected people's lives dramatically with a significant adverse impact on health, economic and social aspects.^{1,2} In early pandemic days, there was no treatment for COVID-19 pushing the scientific communities to experiment all possible medicine that had a beneficial role on other coronaviruses like MERS-CoV and SARS-CoV which reported to have a severe adverse effect on patients.³⁻⁵ Many antiviral and anticoagulant now are used to prevent the severe consequences and death associated with COVID-19.⁶ However, the majority of people had mild to moderate symptoms and recovered at home using over the counter medicines.⁷ COVID-19 vaccine acceptance was low at early days or vaccine release, but now it reaches up to 79.1%.⁸

On the other hand, individuals returned to some traditional remedies to prevent getting COVID-19, relieve symptoms, and shorten the disease course.⁹⁻¹¹ CAM use is widespread practice due to its availability and increased perception of safety.⁹ About more than 50% of people were reported to use some sort of CAM remedies to prevent

or treat COVID-19.⁹⁻¹¹ The perceived COVID-19 risk was reported to be negatively correlated with CAM and holistic health use.¹⁰ Many studies reported that using Complementary and alternative medicine (CAM) showed a positive effect against COVID-19 when it was combined with conventional medicine.^{12,13} Chinese herbal medicine was used as an add-on treatment with standard care helps to improve outcomes in both SARS and COVID-19.^{14,15} About 12 traditional Chinese herbs, most commonly used Agastachis Herba (Huo Xiang), Citri Reticulatae Pericarpium (Chen Pi), and Glycyrrhizae Radix et Rhizoma (Gan Cao), were consistently reported to treat fatigue, fever, chills, heavy limbs, and gastrointestinal symptoms associated with COVID-19.¹² In India, complementary medicine also used as a single or as adjunct treatment for pharmacological medication to prevent the severe consequences of the disease.¹⁶ There is an evident anti-inflammatory and antiviral effect of some Indian complementary medicine that contain herbal formulations.^{17,18} Many plants and herbs were already used in the synthesis and development of many drugs.¹⁹ For example, patients with cardiovascular diseases who used CAM showed positive effects on their personal and body control.²⁰ It is used to control symptoms of the gastrointestinal tract like dyspepsia,

nausea, and vomiting.^{18,21} In some cases, CAM has the advantage over conventional therapy in treating acute respiratory and ear infections.²² CAM can boost our immunity against diseases which may have a role in disease prevention.²³ Thus, many guidelines related to herbal medicine use had been issued for COVID-19 prevention and treatment²⁴

Using CAM is traditional in the Middle East,²⁵ where unique herbal medicine can grow.²⁶ Some of the practices also remain from Islamic and Arabic culture that encourages herbal medicine usage.²⁷ Thus, this study's goal is to determine the frequency and types of CAM use during COVID-19 pandemic peak in Jordan. Understand people's perception regarding CAM use and its effect on COVID-19 symptoms. Identify the possible positive role of each reported CAM on disease symptoms relief.

Methods

Study setting

An online cross-sectional study was conducted on adults aged 18 years old and above live in Jordan between August 4th, 2021 to August 12th, 2021. Participants were recruited via online social media platforms (Facebook, Twitter, WhatsApp, Instagram) using Google forms. A personnel request with Google form link was sent to participants' social media accounts. In addition, the questionnaire was distributed to students and lecturers of some universities in Jordan. The target sample size was calculated using a sample size online calculator (MedCalc v.20.218). Significance level was set at 0.05, β -level on 0.20 (the power of test is 80%), and the correlation coefficient between two variables is thought to be 0.2, the minimum sample size was required for our study was 384. The final collected sample size was 681 responses.

Ethical consideration

The first section of the questionnaire included a brief description of the study aim with the definition of the alternative and complementary medicine and informed consent statement. Filling the questionnaire was considered as an approval to participate in the study. Ethical approval for the study was obtained from Yarmouk University Institutional Review Board, (IRB/2021/53).

Questionnaire

The self-administered questionnaire was developed and evaluated by the researchers. It included 6 sections with a total of 26 questions. The second section included question about socio-demographic characteristics, and medical history. Socio-demographic factors included age (18-24, 50-25, 70-51, and >70 years), sex (male, female), education (<bachelor, bachelor, >bachelor), marital status (married, unmarried), residence (north, middle, south), occupation status (employed, retired, student, unemployed). Medical history was assessed by the question "Do you have any chronic diseases?" (Yes, no). The third section included self-reported COVID-19 infection characteristics. A previous COVID-19 infection characteristics were assessed by "Did you have a COVID-19 infection confirmed by PCR test?" (Yes, no), "The duration of COVID-19 infection (days) was?" (3-4, 5-10, >10 days), and "Did you need for hospitalization due to your COVID-19 infection?" (Yes, no). Self-rated COVID-19 symptoms severity was assessed by the following question "How did you evaluate your COVID-19 infection symptoms severity?" (Mild, moderate, severe).

CAM uses

Participant's attitudes and perceptions toward CAM was included in the fourth section using the following questions "Did use complementary and alternative medicine like herbal remedies, supplements, or certain traditional practices during your COVID-19 infection?" (Yes, no), "Do you believe in complementary and alternative medicine effectiveness in preventing or treating diseases?" (Yes, no), "What is your CAM information sources?" (Internet, inherited from parents, friends advise, herbalist, scientific webpages, physicians, other), "what kind of herbs or practice did you use during your COVID-19 infection?" (Open-ended question), "After using CAM, did your COVID-19 symptoms ...?" (Improved, didn't improve or worsen), and "If your COVID-19 did improve with CAM use, what symptoms were improved?" (Overall symptoms, headache, sneezing, fatigue, anosmia and ageusia, and breathing).

Statistical analysis

Baseline characteristics were represented as frequency and percentages. For bivariate analysis chi-square were used to compare groups, p-value <0.05. To determine the types of CAM used the most by participants, content analysis of the open-ended questions was used to calculate the frequency. To estimate the correlation between each CAM item and self-reported symptoms improvement, CAM items and each COVID-19 symptoms were re-coded as 0,1. Cramer's V was used to determine the correlation coefficient (r) and p-value.²⁸ All data were analyzed using SPSS version 26.

Results

CAM use attitude and perceptions

Among 680 participants, 613 (90.1%) reported to use at least one CAM remedies (Table 1). The majority of CAM users (n=613) believed in CAM effectiveness in treating or preventing COVID-19 infection 91.8%. About 57.5% of CAM users reported to use CAM as a treatment for COVID-19. In addition, CAM was used mainly to promote health and become healthier, 56.5%. The majority reported to use their traditional family recipe or following friends' recommendations, 42.06% and 41.6% respectively. Most participants felt that CAM helped in improving their symptoms 84.1% while the rest didn't see any difference or worsen the disease 15.9%.

A total of 680 had completed the questionnaire, only 1 respondent were deleted due to missing COVID-19 and CAM related data. The majority of respondents aged between 25-50 (44.9%) female represent (75.6%), hold a bachelor degree (50.6%), not married (52.1%), lived in the Northern Province (57.8%), employment (45.4%), and (80.6%) reported that they didn't have chronic diseases (Table 2). COVID-19 infection was confirmed by PCR in 60.95 of respondents. Most of the participants reported a moderate COVID-19 symptoms severity (56.5%) with symptoms duration less than 10 days (68.4%). Only 19.1% reported a severe course of COVID-19 infection and 4.7% got hospitalized. Among those with PCR confirmed COVID-19 infection, 94.2% reported to use CAM to help them during the disease, p-value <0.05 (Table 2). Disease duration also significantly different between CAM user and non-users, those reported severe symptoms has the highest percentage of CAM use 93.8% (p-value <0.05). From socio-demographic factors, only sex and residence was significantly difference in CAM use (Table 2).

Table 1 CAM use characteristics and perceptions

	Count	Table N %
CAM uses among respondents		
Yes	613	90.10%
No	67	9.90%
Believes in CAM efficacy		
Yes	624	91.80%
No	56	8.20%
Reasons to Use CAM		
Promote my health	384	56.50%
Prevent infection	166	24.40%
As a remedy	391	57.50%
Sources of CAM information		
Family recipe	286	42.06%
Friends recommendation	283	41.60%
Internet	239	35.15%
Scientific webpages	169	24.85%
Physicians	163	23.97%
Herbalist	42	6.18%
CAM effect perceptions		
Symptoms relieves	572	84.10%
Didn't help/worsen	108	15.90%

Table 2 Socio-demographic characteristics and COVID-19 infection characteristics by CAM use among respondents (N=680)

Variables	Total N=680	(%)	CAM uses				p-value
			No N=67	9.9%	Yes N=613	90.1%	
Age (Years)							
18-24	299	44.0%	37	12.4%	262	87.6%	0.1
25-50	305	44.9%	22	7.2%	283	92.8%	
> 50	76	11.2%	8	10.5%	68	89.5%	
Sex							
Female	514	75.6%	35	6.8%	479	93.2%	<0.001*
Male	166	24.4%	32	19.3%	134	80.7%	
Region							
Middle	245	36.0%	23	9.4%	222	90.6%	0.002*
North	393	57.8%	38	9.7%	355	90.3%	
South	30	4.4%	1	3.3%	29	96.7%	
Outside	12	1.8%	5	41.7%	7	58.3%	
Education							
< Bachelor	279	41.0%	30	10.8%	249	89.2%	0.7
Bachelor	344	50.6%	31	9.0%	313	91.0%	
> Bachelor	57	8.4%	6	10.5%	51	89.5%	
Occupation status							
Employed	309	45.4%	31	10.0%	278	90.0%	0.6
Retired	27	4.0%	2	7.4%	25	92.6%	
Student	137	20.1%	17	12.4%	120	87.6%	

Table 2 Continued...

				CAM uses			
				No	Yes		
	Unemployed	207	30.4%	17	8.2%	190	91.8%
Marital status							
	Married	326	47.9%	40	12.3%	286	87.7%
	Not-married	354	52.1%	27	7.6%	327	92.4%
Chronic diseases							
	No	548	80.6%	55	10.0%	493	90.0%
	Yes	132	19.4%	12	9.1%	120	90.9%
PCR confirmed COVID-19							
	No	266	39.1%	43	16.2%	223	83.8%
	Yes	414	60.9%	24	5.8%	390	94.2%
COVID-19 duration (days)							
	3-4	254	37.4%	35	13.8%	219	86.2%
	5-10	211	31.0%	17	8.1%	194	91.9%
	>10	215	31.6%	15	6.9%	200	93.0%
COVID-19 hospitalization							
	No	648	95.3%	62	9.6%	586	90.4%
	Yes	32	4.7%	5	15.6%	27	84.4%
Self-rated COVID-19 symptoms severity							
	Mild	166	24.4%	29	17.5%	137	82.5%
	Moderate	384	56.5%	30	7.8%	354	92.2%
	Sever	130	19.10%	8	6.2%	122	93.8%

Socio-demographic and COVID-19 infection characteristics

The most common CAM remedies used during COVID-19 pandemic were vitamin supplement and herbal medicine. Vitamin C, Lemon, and Zinc uses exceeded 50% of participants (Figure 1). Honey, Ginger, Vitamin D, Anise, Onion, Garlic and Chamomile uses was between 30–49% of participants. Sage, omega 3, clove, cinnamon, black seed, thyme, and turmeric usage between 10–25%. Saussurea costus, Propolis, Wormwood and Cupping were the least used CAM remedies, as their usage did not exceed 10%.

The correlation between CAM uses and COVID-19 symptoms improvement

Most CAM remedies was significantly correlated with improving COVID-19 symptoms in general except Wormwood, Turmeric, and Cupping (Table 3). The correlation coefficient (r) ranges from 0.479 to 0.02. Vitamin C, Onion, Chamomile, Garlic, Black Seed, Thyme, and Sage were significantly correlated all COVID-19 symptoms (Headache, sneezing, fatigue, breathing, and anosmia and ageusia). Lemon had a high correlation coefficient (r=0.167) with headache relieve followed by Garlic, Vitamin C, and Onion. Sneezing reduction was significantly correlated with Chamomile use (r=0.159) followed

by Thyme and Black seed (r=0.149, 0.136, respectively). Fatigue improvement was significantly correlated with Vitamin C, Lemon, and Thyme uses (r ranges from 0.187–0.172). Wormwood was significantly correlated with reducing anosmia & ageusia (r=0.181) followed by Thyme, Lemon, And Turmeric. Turmeric had the highest significant correlation coefficient with improving breath (r=0.201), then black seed, Propolis, and Vitamin C.

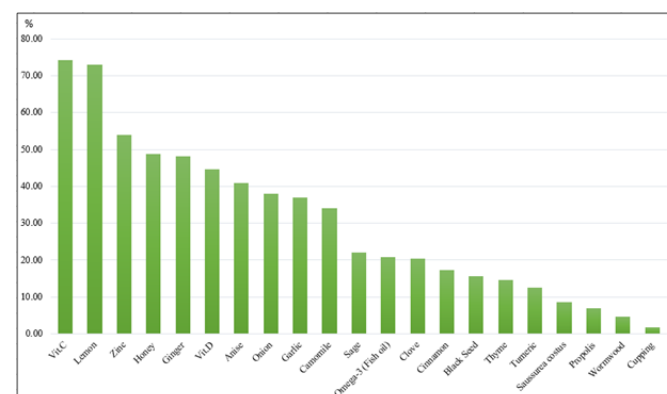


Figure 1 Most commonly used CAM remedies.

Table 3 Correlation between different CAM remedies and self-reported effect on COVID-19 symptoms

	Overall symptoms relieve	Reduce headache	Reduce sneezing	Reduce fatigue	Improve anosmia & ageusia	Improve breathing
Vit. C	.479**	.145**	.086*	.187**	.138**	.170**
Lemon	.440**	.167**	0.0512	.175**	.168**	.119**
Zinc	.305**	0.0508	0.0069	.079*	0.0627	.137**
Ginger	.303**	.128**	0.06647	0.05716	.098*	.081*
Honey	.301**	0.05107	0.0615	.105**	.076*	.159**
Onion	.232**	.142**	.097*	.147**	.110**	.147**
Chamomile	.228**	.135**	.159**	.165**	.076*	.134**
Anise	.220**	.150**	0.04746	.082*	0.05643	.130**
Vit. D	.217**	0.0102	-0.0073	.091*	0.06584	.119**
Garlic	.199**	.155**	.115**	.169**	.136**	.122**
Omega 3(fish oil)	.168**	0.07171	0.06676	0.05796	-0.005	.163**
Black Seed	.150**	.123**	.136**	.149**	.078*	.185**
Cinnamon	.141**	.094*	.090*	0.02203	-0.0035	-0.0142
Clove	.124**	0.06186	0.0712	0.05809	.113**	.097*
Sage	.118**	.121**	.080*	.124**	0.03806	.117**
Thyme	.107**	.104**	.149**	.172**	.176**	.135**
Saussurea costus	.102**	.094*	0.03483	0.06042	.098*	.155**
Propolis	.084*	0.04863	.100**	-0.0013	.076*	.181**
Wormwood	0.07513	0.06861	0.04032	.097*	.181**	.153**
Turmeric	0.06177	.108**	0.00552	.141**	.149**	.201**
Cupping	0.02592	0.02835	0.06593	.083*	0.00852	0.01101

*P-value < 0.05, ** P-value <0.01 (R correlation coefficient was calculated using Cramer-V method).

Discussion

The emergence of COVID-19, increase individuals' tendency to use complementary and alternative remedies. Especially in early pandemic time were neither effective treatment nor vaccine were available.^{3,29} Thus people in different culture and countries across the globe returned to their traditional practices and herbal remedies to prevent the sever complication of the disease and improve general well-being.³⁰⁻³² This study reported a high rate (90.1%) CAM use during early COVID-19. Most of Jordanians had a strong (91.8%) believes in CAM effectiveness in treating, improving, and preventing COVID-19. This is similar to a study that has shown an increased tendency toward CAM during the COVID-19 pandemic in the same region and globally.²⁷ Studies from Saudi Arabia showed that about 60% and above used some sort of Herbal remedies during COVID-19 pandemic,^{33,34} while global dietary and herbal supplement uses rate ranged from 25% to 70%.³⁵ Most of the study participants (91.8%) believed in the efficacy and safety of CAM which corresponds with studies done in Australia were 93.3% of midwives believed to be effective and 91.75 to be safe.³⁶

A study in this regard doesn't agree with our results, as it indicated that people used CAM for reasons like positive beliefs as well as environmental influences by high percentages that are 63% and 51% respectively.³⁷

Promoting overall health and relieving COVID-19 symptoms were the main reasons to use CAM. In our study, 56-57% participants used CAM for these two reasons and 24.4% only for preventing COVID-19 infection. In addition, 84% reported that CAM aid in relieving their COVID-19 symptoms. Many cross sectional survey reported similar results.

While there is a study that showed treatment of the disease as the main reason for its use,¹² others also included other reasons such as prevention and symptom relief.²⁷ For example, a study conducted in Lithuania reported that 51.7% of the respondents used herbs to relieve symptoms such as cough and shortness of breath.³⁸

Some herbs showed an antiviral effect by inhibiting virus entry or replication, and some boost immune system against infections.³⁹ This may explain the observed beneficial effect of these remedies.

Later, clinical trials (RCT) proved that CAM has some therapeutic effect and improved COVID-19 patients who use it with western medicine During their COVID-19 infection. In a systematic review and meta-analysis for RCTs, Liang Shi-Bing et.al.⁴⁰ reported using Traditional Chinese Medicine along with western therapy significantly improved cure rate (RR=1.20, 95 % CI 1.04-1.38), and reduced aggravation rate (RR = 0.50, 95 % CI 0.29-0.85). Traditional Chinese Medicine users also had a shortened fever duration, cough and fatigue, improved chest CT manifestations.⁴⁰ Moreover, traditional Chinese medicine reduced COVID-19 cases transition from moderate to severe disease (RR 0.58 [95% CI 0.43-0.77]).⁴¹ However, these studies reported the combined effect of traditional Chinese medicine and not their solo use. In addition, many remedies were used alone or as a mix of many herbs in combination with western therapy.

The objective of our study was to evaluate the utilization of various spices, herbs, and foods by participants during the COVID-19 pandemic. Our data reported that the intention toward supplements were used highly during COVID-19 pandemic among Jordanians was very significant; vitamin C was the most remedy used as a part of complementary and alternative medicine against COVID-19 (74.2%), which is consistent with studies suggesting positive effect for vitamin C supplements in COVID-19 patients.⁴²⁻⁴⁴ There 54.7% of

participants used zinc to control the infection, and we found a study that deduced that zinc could improve the immune response.⁴⁵ As well, about 44.5% of the participants used vitamin D as a supplement, and 21% used fish oil, and this is in accordance with a study proved that these vitamins have lowered the risk of having SARS-CoV-2 infection by 12% and 9% respectively.⁴⁶ Also, there is a study that reported that higher dosages of vitamins C, D, and zinc have a significantly positive effect during COVID-19.⁴⁷

Our findings showed that 20.4% and 17.3% of participants utilized clove and cinnamon, respectively. These results are consistent with previous studies that suggest these spices may have a potential role in the management of COVID-19. Cinnamon, for example, has been demonstrated to possess antiviral properties,⁴⁸ while clove has been reported to have similar effects.⁴⁹ 4.7% of participants utilized wormwood, which has been shown to possess anti-inflammatory, antioxidant, antimicrobial, and antiviral properties.⁵⁰ 6.9% of participants used propolis, which has been reported to have potential as a treatment for COVID-19.⁵¹ 14.7% of participants utilized thyme, which was found to have a positive impact on COVID-19 patients due to its antioxidant, anti-inflammatory, and antiviral properties.⁵² Our study also revealed that 22% of participants utilized sage, which aligns with previous research that reported benefits against COVID-19.⁵³

Only 0.2% of participants in our study utilized chicken soup during COVID-19 infection. Although a study has reported that chicken soup may provide psychosocial support during COVID-19, there is no evidence of its clinical effect against COVID-19, positive or negative.⁵⁴ 8.9% of participants in our study utilized *Saussurea costus*, and there is evidence that the extract from its root possesses antimicrobial effects against certain pathogens.⁵⁵

Our study found that 72.9% of participants utilized lemons, 48% utilized ginger, 12.9% utilized turmeric, 40.8% utilized anise, 48.8% utilized honey, and 15.7% utilized black seed. These results are comparable to a study conducted in Saudi Arabia, where 45.2% of participants utilized lemon, 36% utilized ginger, 19.4% utilized turmeric, 14.2% utilized anise, 46.1% utilized honey, and 26% utilized black seed. The most commonly utilized combinations were lemon and honey, and a mixture of lemon, honey, and ginger. All of these ingredients have been demonstrated to possess antiviral properties, among other benefits.^{33,56-6}

Additionally, the article “Antiviral Essential Oils Incorporated in Nanocarriers: A Strategy for Prevention of COVID-19 and Future Infectious Pandemics” was published in 2020 stated that essential oils, due to their antiviral properties, may be an effective treatment for viral infections. To enhance the effectiveness of these essential oils, the authors propose the use of nanotechnology-based carriers. Although the article is a literature review and does not provide direct experimentation on COVID-19, it provides a comprehensive overview of the current research on essential oils and their potential use in treating viral infections.

Onion and garlic were used by 38% and 37.2% respectively. Another study in Saudi Arabia about herbal treatments of COVID-19 showed that 17% of its participants used onion and 31% used garlic to improve their immunity and their general health, and both are evidenced to have an anti-infectious role.⁶²⁻⁶⁴ Chamomile is also among the herbs that were used by 34.4% of participants. Noting was one of the most used herbs in treating respiratory symptoms in a study conducted in Cusco, Peru.⁶⁵

Although there were many benefits for CAM in COVID-19 as it was shown and only 0.3% of people who used CAM reported an

increase in symptoms, there are also possible risks.⁶⁶ To date this study is the first study conducted in Jordan to assess the use of CAM in COVID-19 pandemic; we anticipate that this study will inspire further research to investigate reported CAM remedies benefits and risks.

There were some limitations for the study. First, it's a cross-sectional survey-based study that could include information-bias. Second, there was a selection bias since we used social media to distribute our questionnaire, so that made the age categories that were more predominant were the 18-24 and the 24-50 because the social media users are the youth usually, as well as most of the researchers are females so 75.6% of the respondents are females, and this is a limitation imposed by Jordanian culture. Furthermore, the target population was people who had COVID-19 disease, and this restricted the actual number of CAM users during the pandemic, because there were users for prevention purposes among Jordanian people who didn't have COVID-19 so the actual frequency of preventive use of CAM is much higher. Finally, the responders weren't equally selected across the country, there were more responders from the northern area because most of the researchers are from the north.

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Conflicts of interest

The author declares that they have no conflicts of interest.

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