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Assessment of the complementary and integrative medicine utilization among patients with multiple sclerosis using a translated and adapted version of the international questionnaire (I-CAM-QP): A cross-sectional study in Southern Iran

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ABSTRACT

Aims: To assess the prevalence of and factors related to complementary and integrative medicine (CIM) use among multiple sclerosis (MS) patients, using a translated and adapted version of a standard international questionnaire.

Methods: International complementary and alternative medicine questionnaire (I-CAM-Q) was used. A cross-sectional study was done to assess the prevalence of and factors associated with CIM use among MS patients in Southern Iran. Patients who were randomly selected from MS registry center, were interviewed via phone calls.

Results: Three hundred patients were enrolled in the study; 69% of them were female. Their mean age was 36.6 ± 8.53 years and the mean duration of the disease was 5.6 ± 4.22 years. In all, 99.3% (95% CI) of the patients had used at least one type of CIM. Herbal medicines and dietary supplements were the most commonly used CIM type (97.3%; 95% CI). Praying was the most common modality among all CIM subgroups (81.3%; 95% CI). Long term illness (MS) was selected as the main reason for the last use of all CIM types. Having non-tertiary education and having sequel due to MS were related to visiting a CIM provider (adjusted odds ratio (AOR) = 2.32, 95% confidence interval (CI) = 1.22–4.43), (AOR = 2.67, 95% CI = 1.47–4.83) respectively. Being female was related to the use of self-help practices (AOR = 3.41, 95% CI = 1.5–7.72).

Conclusion: There is a high prevalence of CIM use among MS patients. Therefore, patient- physician communication about CIM use should be emphasized.

1. Introduction

Multiple sclerosis (MS) is an inflammatory immunological disease of the central nervous system. Although different pathological mechanisms have been proposed, its etiology is still unknown.[1,2] MS is known as the most common non-traumatic cause of disability in young adults.[1] It has a high economical and psychological burden and reduces the health-related quality of life significantly.[3,4]

In 2016, it was estimated that 2,221,188 patients were suffering from MS globally.[5] The mean global prevalence of the affected people was 33 per 100,000,[6] but local studies conducted in Iran reported a much higher prevalence (even up to 75 per 100,000).This has placed Iran as one of the most hazardous countries of Asia and the Middle East for MS.[7,8] Different studies in Iran have shown rapid increase in MS prevalence, particularly among females.[7,9]

According to the world health organization (WHO) definition, complementary and alternative medicine (CAM) includes a number of disease preventive, diagnostic and curative activities that are not applied in conventional medicine, such as herbal therapies, acupuncture, massage therapy, etc.[10] As many evidence-based CAM modalities are being integrated to conventional medicine, the name has changed to complementary and integrative medicine (CIM).[11]

Abbreviations: MS, multiple sclerosis; CIM, complementary and integrative medicine; I-CAM-Q, international complementary and alternative medicine questionnaire

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Despite broad advance in conventional therapies for MS, there are still challenges regarding their side effects and ineffectiveness in some cases. Therefore, many MS patients utilize complementary and integrative medicine (CIM).[12,13] Different reasons are proposed for popularity and increasing use of CIM including partial responsiveness of conventional medicine, expensiveness of conventional therapies, holistic approach of CIM, and less availability of conventional care in developing countries.[11,14–16]

The widespread CIM usage highlights the importance of the physicians' awareness of drug interactions and probable side effects of CIM remedies. However, studies show that many conventional physicians are not aware of CIM utilization by their patients.[17,18]

Data reported from different studies has a broad range therefore, using a standard and identical scale is essential for comparing data, especially at international level.[15,19,20] In this regard, in 2006, National Research Center in Complementary and Alternative Medicine (NAFKAM) of Norway designed a standard international questionnaire that was named I-CAM-Q (international complementary and alternative medicine questionnaire).[21] It was published in 2009 and since then it has been translated and adapted to different languages.[22,23]

As there is data scarcity about CIM usage by MS patients in Iran and there is no adapted Persian version of available international questionnaires, the aim of this study was to translate and adapt the I-CAM-Q to assess CIM usage by MS patients to help evidence-based policy making and management of the disease.

2. Methods

2.1. The original format of the I-CAM-Q

The original questionnaire was developed during a workshop consisting of researchers of different specialties to develop a questionnaire for international usage which would be not specific to any medical care, country, culture or cultural tradition. It is in English and contains 4 sections. The first section assesses visits to CIM providers. The second section is about CIM therapies that are offered by physicians. The third section is on herbs, supplements and homeopathic drugs that are used, and the fourth section is about self-help practices such as yoga and meditation. In each section, several subtypes are listed and for each subtype there are 4 questions. The first question is about performing or using that CIM subtype in the previous 12 months. The second is the number of times that the CIM subtype was performed in the last three months (Sections 1, 2 and 4 of the questionnaire) or current use as in Section 2. The third question asks about the main reason of use/practice, and the last is about the satisfaction rate. Each section has the capacity of adding extra proper subtypes.

2.2. Translating and adapting the questionnaire to Persian

Forward translation of the questionnaire from English to Persian was done in a group consisting of one MD, MPH, PhD, who was expert in CIM researches, one MD Persian medicine (the traditional medicine that is practiced widely in Iran (Persia)) specialist and an expert in questionnaire researches and a bilingual translator. Backward translation from Persian to English was done by another bilingual translator and intellectual compatibility of the questionnaire with the original one was approved.

To assess the content validity of the questionnaire, Delphi expert consensus panel was conducted. The members were one epidemiologist who was expert in CIM researches and 3 Persian medicine specialists and an epidemiologist expert in questionnaire researches. The electronic version was sent to experts. Experts were asked to declare any option that should be added or deleted. They were also asked to change any word or phrase if needed for better understanding. At the end of the first phase, as some CIM modalities such as homeopathy and acupuncture are most practiced by physicians in Iran, the option "physician "of the first section of the original questionnaire was omitted and "Persian medicine" was added. Then to apply the questionnaire for MS patients 2 questions about MS status including duration of the disease and also having disability due to the disease were added. In all four sections of the original questionnaire in the part of the main reason of the last visit/use, the long term illness section was divided into two subtypes, MS and non-MS. Demographic characteristics including age, gender, place of residency, literacy status, marital status, job and monthly income were added to the questionnaire according to experts' consensus. Three questions about informing conventional physician about visiting CIM providers, reason of not disclosing and the effect of using CIM on reducing or abruption of conventional drugs were also added to the end of the questionnaire. The second round was conducted with newly added/deleted questions/options and equal to or greater than 70% agreement was achieved for each question/option.

Pilot study was done on 20 healthy individuals for assessing the face validity of the questionnaire. The interview lasted about 5–20 min based on using or not using CIM modalities, respectively. As it was hard for the respondents to say the number of times for self-help practices, we used daily, weekly, monthly, less than once a month and not at all, as it was used in the German version. Similar to that version, we found that the landscape page style was better.[23] The questionnaire had minor revision after the pretest for better understanding of some terms.

2.3. The main study

This cross-sectional study was done between March and August 2018. Study participants were registered MS patients in Fars MS registry (FMSR) affiliated to Shiraz University of Medical Sciences. All confirmed MS patients from Fars province who are candidate for receiving drugs are registered by the FMSR. The inclusion criteria were being at age 18 and above, having an approved diagnosis of MS at least 1 year prior to the study recruitment, and an oral consent to participation. Exclusion criteria were non- responsiveness to two phone calls in different days or not having consent for study participation.

A minimum sample size of 271 MS patients was calculated using the Cochran's formula for sample size calculation in prevalence studies. A prevalence of 85% of CIM use among MS patients according to previous studies with similar questionnaire,[1,2] type I error 5% and precision of 5% of prevalence were assumed. Considering a response rate of 70% if phone number be valid, the sample size became 352 patients. With assumption of a 20% non-valid phone numbers, the ultimate sample size became 406 patients. Four hundred and six patients were selected by simple random sampling method. To do this, FMSR electronic data was used. Data was gathered by performing structured interviews via phone calls; as prior studies reported poor compliance of self-administered method.[22] The patients' phone numbers were extracted from their records and two calls were scheduled for each of the selected participants at different day times. If the first call was successful no more call was needed. Patients with two missed calls were ignored and considered as non-response cases.

Two experienced interviewers were trained during educational and role playing sessions. In a call, at first, interviewers introduced themselves and review the study aim and procedures to the participants. Participants were, then, asked if they were interested in participating in the study. After informed oral consent was taken, the participants were asked to respond each question. Data on patients' demographic characteristics and health status were collected in addition to the data on the CIM usage (see results section).

Among 406 patients, 48 did not answer the phone for two different calls in 2 different days, 49 had invalid numbers, 8 cases declined to response to questions and one case was expired. The response rate was 74% (406 calls to reach 300).

2.4. Data analysis

Data analysis was carried out using IBM (International Business Machines Corporation) SPSS (Statistical Package for the Social Science), version 25. For analyzing the third part, herbal medicines and dietary supplements, 50 filled questionnaires were assessed and according to the most used herbal drugs and dietary supplements SPSS codes were defined. The last code was defined as others. Code "99" was defined as the missing one for all parts of the questionnaire.

For descriptive analysis, frequencies, means and standard deviations were calculated. Binary logistic regression was used with the independent variables of age, gender, education, residency location, marital status, monthly income, duration of MS and having sequel due to MS; the dependent variable was CIM use in the past 12 months. The regression model was fitted applying a backward elimination technique. P values less than 0.05 was considered significant.

2.5. Ethics and consent

The research was approved by the research ethics committee of Shiraz University of Medical Sciences (reference number: IR.SUMS.REC.1396.S506). As the study was conducted via telephone interviews, patients declared oral consents instead of written ones.

3. Results

3.1. Patients' characteristics

Overall, 300 MS patients participated in the study. Demographic and MS disease characteristics of the respondents are shown in Table 1.

The majority (69%) of the participants were female; their overall mean age was 36.6 ± 8.53 years, and most (53%) of them had non-tertiary education. 95.7% resided in urban areas, 75% were married, and 50.3% were housekeepers. Most (66%) of the patients had intermediate household income. Among these patients, the mean duration of MS was 5.6 ± 4.22 years and 54.7% declared at least one disability due to MS.

Table 1
Socio-demographic characteristics of patients.

	Patients (N = 300); n (%)
Age (year)	
18-29	59 (19.7)
30-39	150 (50)
40-49	64 (21.3)
50+	27 (9)
Gender	
Male	69 (23)
Female	231 (69)
Education	
Tertiary	127 (42.3)
Non- Tertiary	159 (53)
Missing data	14 (4.7)
Marital Status	
Single	68 (22.7)
Married	225 (75)
Divorced	3 (1)
Missing data	4 (1.3)
Residence	
Urban	287 (95.7)
Rural	8 (2.7)
Missing data	5 (1.7)
Household income	
Low	79 (26.3)
Moderate	198 (66)
High	13 (4.4)
Missing data	10 (3.3)
Occupation	
Employed	33 (11)
Retired	5 (1.7)
Self-employed	62 (20.7)
Unemployed	37 (12.3)
Housekeeper	151 (50.3)
Missing data	12 (4)
Disability due to MS	
Yes	164 (54.7)
No	116 (38.7)
Missing data	20 (6.7)
MS duration (year)	
1-5	217 (72.3)
6-10	47 (15.7)
11+	36 (12)

3.2. CIM use

In all, 99.3% of the patients had used at least one type of CIM. The most commonly utilized CIM type was herbal medicine and dietary supplements (97.3%, N = 292). The most common CIM subtype among all subtypes of the included CIMs were praying (81.3%, N = 244) and vitamin D (73.3%, N = 220). By excluding praying and dietary supplements, CIM use decreased to 93.3% (N = 280).

3.2.1. Patterns of visiting a CIM provider

Table 2 shows the visiting pattern of CIM providers 12 months prior to the study.

In all 38% (N = 114) of the 300 patients had visited at least one CIM provider. The most (49.1%) visited providers were herbalists and Persian medicine therapists (24.8%). The main reason of the last visit was selected as the long term illness (MS) in most (82.2%) cases. The overall effectiveness of this part was selected as very or somewhat helpful in 65.1% of cases.

3.2.2. Patterns of receiving complementary treatments from physicians

Twenty four (8%) out of 300 patients had received at least one CIM treatment from physicians during the last 12 months. As Table 3 shows, the most (54.8%) common treatment received from physicians was herbs.

The main reason for receiving CIM treatments from physicians was selected as long term illness (MS) in most (87.9%) cases. The overall effectiveness of this part was selected as very or somewhat helpful in most (70.4%) cases.

3.2.3. Patterns of the third section: use of herbal medicines and dietary supplements

Two hundred and ninety two (97.3%) out of 300 patients had used at least one herbal medicine or dietary supplement during the last 12 months. The most frequently used herbal medicine and dietary supplements were vitamin D (73.3%, N = 220), saffron (44.3%, N = 133) and ginger (33.3%, N = 100) (Table 4).

Only one patient was treated with homeopathic remedies but she was not aware of the homeopathic drugs' names. The main reason for the last use was selected as long term illness (MS) in most (74.2%) cases. The overall effectiveness of this part was selected as very or somewhat helpful in most (76.31%) cases.

3.2.4. Patterns of the fourth section: self-help practices

Eighty-seven percent (N = 261) out of 300 patients had practiced at least one self-help techniques during the last 12 months. The most practiced techniques were praying for own health (65.4%), yoga (12.6%) and visualization (11.3%), as shown in Table 5.

The main reason for the last practice was selected as long term illness (MS) in most (82.5%) cases. The overall effectiveness of this part was selected as very or somewhat helpful in most (83.5%) cases.

3.3. Informing the conventional physician

Only 41.7% (N = 30) of the respondents who had visited a CIM provider had informed their conventional physician. The main reason

Table 2
Health care providers consulted in the past 12 months.

	Visited n (%)	Motivation					Helpfulness Very/ somewhat n (%)
		Acuteillness n (%)	Long term illness (MS) n (%)	Long term illness (Except MS) n (%)	To improve well-being n (%)	Others n (%)	Missing data n (%)	
Persian medicine Therapist	40 (13.3)	0	37 (92.5)	1 (2.5)	1 (2.5)	0	1 (2.5)	25 (62.5)
Acupuncturist	8 (2.7)	0	7 (87.5)	1 (12.5)	0	0	0	3 (37.5)
Homeopath	5 (1.7)	0	5 (100)	0	0	0	0	4 (80)
Herbalist	79 (26.3)	0	57 (72.15)	16 (20.3)	4 (5.1)	0	2 (2.5)	50 (63.3)
Spiritual healer	9 (3)	0	7 (77.8)	1 (11.1)	0	0	1 (11.1)	5 (55.5)
Manual therapist	9 (3)	0	5 (55.5)	3 (33.3)	0	0	1 (11.1)	7 (77.8)
Energy therapist	5 (1.7)	0	4 (80)	0	0	0	1 (20)	3 (60)
Chiropractor	1 (.3)	0	0	0	0	0	1 (100)	0
Other	4 (1.3)	0	3 (75)	0	0	0	1 (25)	2 (50)

For feasibility of data comparison between tables, data of the first column is calculated in regard to total number of patients (N = 300) and as each patient could select more than one option, data do not sum up to 100%.

for not informing them was that the patients thought it was not necessary to communicate with their physician about it (46.3%).

3.4. Side effects and outcomes

Side effects due to CIM use were reported by 12.5% (N = 2) of the respondents who had visited a CIM provider. Seven patients (11.3% of the respondents) had reduced or stopped their conventional drugs due to CIM use without permission of their conventional doctors.

3.5. CAM use and associated factors

Stepwise backward conditional logistic regression analyses revealed that having non-tertiary education and sequel due to MS were related to visiting a CIM provider (AOR = 2.32, 95% CI = 1.22–4.43), (AOR = 2.67, 95% CI = 1.47–4.83), respectively. Being female was related to using self-help practices and praying (AOR = 3.41, 95% CI = 1.5–7.72), (AOR = 6.72, 95% CI = 2.63–17.22), respectively. Longer duration of MS (AOR = 1.11, 95%CI = 1.01–1.22) and having no sequel due to MS (AOR = 2.86, 95%CI = 1.51–5.42) were related to visiting an herbalist. Patients with longer duration of MS were less likely to practice yoga (AOR = 1.11, 95% CI = 1.01–1.22), relaxation (AOR = 0.5, 95% CI = 0.27-0.92), and visualization (AOR = 0.842, 95% CI = 0.72-0.98). Data analysis is shown in Table 6.

4. Discussion

4.1. The overall use of CIM

This study showed that almost all (99.3%) patients had used at least one type of CIM in the last 12 months. Prior studies had shown CIM use by MS patients in a wide range (27%–100%). This is mainly due to different questionnaires, containing different CIM types and different time spans (last 12 months to whole disease period).[26–29] The very high percentage of CIM use in this study is most likely due to including herbal medicines, dietary supplements and also self-help practices such as “praying for own health” as CIM types. Other similar studies that have evaluated CIM use in patients with chronic diseases, using similar questionnaires, have reported comparable CIM use rates. In a study, 88% of children and 91% of adults who had genetically mitochondrial disorders had used CIM.[24] In another study conducted in USA, the CIM use in anti-neutrophil cytoplasmic antibody (ANCA) associated vasculitis patients was 81%.[25] The higher percentage of CIM use in the current study may be due to the interview method instead of self-administered one. Other reasons are popularity of herbal remedies among general population in Iran[30] and strong religious beliefs about praying.

4.2. Most practiced/used CIM type

In concordance to prior studies, using natural products was the most common CIM type.[31–33] Vitamin D was the most used subtype of natural products (75.3%, N = 220/292). This has been addressed in another study before. The authors declared that vitamin D was mainly prescribed by conventional doctors.[13] It is mainly due to its critical role in pathogenesis of the MS disease.[34] Older studies in MS had different findings probably due to lack of knowledge in this field at that time.[13]

Praying was the most popular modality among all CIM subgroups (81.3%, N = 244/300). Other studies have reported a wide range of 5.9–64 %.[25,35,36] The difference among studies is probably due to diversity of religious beliefs in different cultures and also health status of the studied populations.

Table 3
Complementary treatments received from physicians (MDs).

	Received n (%)	Motivation					Helpfulness Very/ somewhat n (%)
		Acuteillness n (%)	Long term illness (MS) n (%)	Long term illness (except MS) n (%)	To improve well-being n (%)	Others n (%)	Missing data n (%)	
Acupuncture	5 (1.7)	0	5 (100)	0	0	0	0	3 (60)
Homeopathy	4 (1.3)	0	4 (100)	0	0	0	0	2 (50)
Herbs	17 (5.7)	0	16 (94.1)	0	1 (5.9)	0	0	13 (76.5)
Spiritual Healing	2 (.7)	0	1 (50)	0	1 (50)	0	0	2 (100)
Manipulation	2 (.7)	0	1 (50)	1 (50)	0	0	0	2 (100)
Other	1 (.3)	0	0	0	1(100)	0	0	1 (100)

For feasibility of data comparison between tables, data of the first column is calculated in regard to total number of patients (N = 300) and as each patient could select more than one option, data do not sum up to 100%.

Table 4
Use of herbal medicine and dietary supplements.

	used n (%)	Motivation						Helpfulness Very/ somewhat n (%)
		Acute illness n (%)	Long term illness (MS) n (%)	Long term illness (except MS) n (%)	To improve well-being n (%)	Others n (%)	Missing data n (%)	
Borage	56 (18.7)	0	27 (48.2)	14 (25)	10 (17.9)	0	5 (8.9)	42 (75)
Saffron	133 (44.3)	1 (.8)	88 (66.2)	10 (7.5)	32 (24.1)	0	2 (1.5)	99 (74.4)
Ginger	100 (33.3)	0 (0)	63 (63)	10 (10)	20 (20)	0	7 (7)	67 (67)
Chamomile	83 (27.7)	2 (2.4)	53 (63.9)	13 (15.7)	11 (13.3)	0	4 (4.8)	61 (73.5)
Cinnamon	73 (24.3)	1 (1.4)	48 (65.8)	6 (8.2)	16 (21.9)	0	2 (2.7)	49 (67.1)
Lavender	38 (12.7)	0	28(73.9)	7 (18.4)	3 (7.9)	0	0	29 (76.3)
Thyme	20 (6.7)	1 (5)	11 (55)	3 (15)	5 (25)	0	0	15 (75)
Fennel flower	16 (5.3)	0	12 (75)	0	3 (18.75)	0	1 (6.3)	12 (75)
Honey	39 (13)	0	29 (74.4)	1 (2.6)	7 (17.9)	0	2 (5.1)	28 (71.8)
Other herbs	134 (44.7)	1 (.7)	93 (69.4)	20 (14.9)	15 (11.2)	0	5 (3.7)	112 (83.6)
Vitamin D	220 (73.3)	2 (.9)	195 (88.6)	6 (2.7)	6 (2.7)	0	11 (5)	133 (60.5)
Calcium-D	64 (21.3)	4 (6.3)	47 (73.4)	5 (7.8)	2 (3.1)	0	6 (9.4)	44 (68.8)
Omega3	68 (22.7)	0	56 (82.4)	3 (4.4)	5 (7.4)	0	4 (5.9)	48 (70.6)
Multivitamin	51 (17)	1 (2)	37 (72.5)	2 (3.9)	7 (13.7)	0	4 (7.8)	32 (62.7)
Folic acid	12 (4)	0	8 (66.7)	2 (16.7)	1 (8.3)	0	1 (8.3)	7 (58.3)
Q10	3 (1)	0	2 (66.7)	0	0	0	1 (33.3)	2 (66.7)
Other supplements	71 (23.7)	2 (2.8)	46 (64.8)	5 (7)	9 (12.7)	0	9 (12.7)	24 (36.4)

For feasibility of data comparison between tables, data of the first column is calculated in regard to total number of patients (N = 300) and as each patient could select more than one option, data do not sum up to 100%.

4.3. Related factors to CIM use

Having non-tertiary education was related to visiting CIM providers. Higher tendency of lower educated people toward using CIM was addressed in some other studies from developing countries.[32,37] However, data from more developed countries show greater use of CIM among highly educated people.[31,38]Visiting CIM provider was also associated with having sequel due to MS. This probably happens since patients with more disability try to leave no stone unturned to improve their health condition. Self-help practices were more popular among females. This was in concordance with other studies.[31,36]

4.4. Patient -physician communication

In this study, the patient-physician communication was assessed only for visiting CIM providers. As using herbal remedies is part of Iranian' lifestyle, the communication related to total CIM use is probably much lower. Unsatisfactory level of patient-physician communication about CIM use has been addressed in different studies.[39,40] Feeling that it was not necessary to communicate with their physician, was the main reason for not informing them (46.3%). Some studies have reported the same main reason, while others have proposed different reasons such as: physicians do not ask the patients about that, and patients are frightened from their physician's reaction.[25] Physicians should be aware that many patients deny using any form of CIM because they do not know it is part of CIM use.[39] In the current study, at the beginning of the interview many patients emphasized that they just used conventional drugs, but at the end almost all patients had used at least one type of CIM.

4.5. Concerns

In Iran, only medical doctors who have CIM specialties are legally allowed to treat patients, but although about 40% of patients had visited CIM providers, treatments received from physicians were only 5%. As there is no qualification processes for non-physician CIM providers in Iran, patients are at high potential risk for wrong diagnosis and treatment. Informing the population about these physicians with CIM specialties, hazard of referring to illegal practitioners and also expanding legal CIM institutions are crucial.

Table 5
Self-help practices.

	Practiced n (%)	Motivation						Helpfulness Very/ somewhat n (%)
		Acute illness n (%)	Long term illness (MS) n (%)	Long term illness (Except MS) n (%)	To improve well-being n (%)	Others n (%)	Missing data n (%)	
Meditation	16 (5.3)	0	12 (75)	2 (12.5)	0	0	2 (12.5)	13 (81.2)
Yoga	47 (15.7)	0	37 (78.7)	1 (2.1)	1 (2.1)	0	8 (17)	36 (76.5)
Relaxation techniques	22 (7.3)	0	16 (72.7)	2 (9.1)	0	0	4 (18.2)	18 (81.8)
Praying for own health	244 (81.3)	0	137 (56.1)	13 (5.3)	36 (14.)	46 (18.)	12 (4.9)	178 (72.9)
Attended traditional healing ceremony	0 (0)	0	0	0	0	0	0	0
Visualization	42 (14)	0	23 (54.7)	4 (9.5)	3 (7.1)	0	12 (28.6)	35 (13.4)
Tai Chi	1 (.3)	0	1 (.4)	0	0	0	0	1 (.4)
Qigong	1 (.3)	0	0	0	0	0	1 (100)	0

For feasibility of data comparison between tables, data of the first column is calculated in regard to total number of patients (N = 300) and as each patient could select more than one option, data do not sum up to 100%.

Table 6
Stepwise backward conditional logistic regression analyses of CAM use/practice in MS patients.

CIM type/ subtype	Independent variable	Crude OR (95% CI)	Adjusted OR (95% CI)
Visiting a CIM provider	Job		
Visiting an herbalist	House keeper (reference)		
	Employed	.6 (.27-1.37)	.46 (.18-1.21)
	Retired	2.1 (.34-12.9)	3.9 (.34-4.4)
	Self-employed	.53 (.28-1.01)	.44 (.21-1.92)
	Workless	1.32 (.64-2.72)	.73 (.31-1.72)
	Disability due to MS*		
	Not having disability (reference)		
	Having disability	1.98 (1.2-3.28)	2.67 (1.44-4.71)
	Education		
	non -tertiary (reference)		
	Tertiary education	1.24 (.77-2.01)	2.32 (1.21-4.42)
	Income		
	High (reference)		
	Moderate	1.82 (.49-6.85)	2.78 (.54-14.27)
	Low	3.25 (.83-12.7)	5.17 (.94-28.32)
	MS duration* (years)	.94 (.87-1.01)	1.11 (1.01-1.22)
	Disability due to MS*		
	Not having disability (reference)		
	Having disability	1.88 (1.07-3.3)	2.86 (1.51-5.42)
Self-help practices	Gender*		
	Male (reference)		
	Female	2.92 (1.43-5.96)	3.41 (1.5-7.72)
Practicing yoga	MS duration* (years)	.82 (.7-.96)	1.11 (1.01-1.22)
	Income		
	High (reference)		
	Moderate	3.23 (.41-25.56)	2.26 (.3-19.2)
	Low	.36 (.03-3.71)	.22 (.02-2.8)
Practicing relaxation	MS Duration (years)*	.87 (.72-1.05)	0.5 (0.27-0.92)
	Disability due to MS		
	Not having disability (reference)		
	Having disability	2.82 (.91-8.72)	3.1 (.89-10.75)
	Income		
	High (reference)		
	Moderate	1.82 (.37-8.85)	13.24 (.61-28.9)
	Low	14.18 (1.19-19. 6)	6.92 (.9-55.1)
Practicing visualization	MS Duration *(years)	1.08(.98-1.19)	0.842(0.72-0.98)
Practicing praying	Gender*		
	Male (reference)		
	Female	2.21(1.18-4.15)	6.72(2.63-17.22)

The table contains CIM types and subtypes that had at least one significant P value.
* $P < 0.05$.

4.6. Transferability of the results to western cultures

As discussed in part 4.2. natural products are commonly used both in western and non-western countries. Another benefit of this study for western or any other countries, is that this international questionnaire that is not specific to any country or culture, can be easily adapted to their special circumstances and is effective and practical for assessing CAM usage.

4.7. Strengths and limitations

This study has some strengths and limitations. The sampling was done from the most valid data of MS patients in Fars province. Another point is the use of a standardized international questionnaire for the first time for MS patients that makes international comparisons possible in the future. Another strength of the study is the interview method via phone calls. This decreased missing data and increased potential accessibility to disabled patients.

The limitations were having no access to the patients' medical records, so disease severity was assessed subjectively by asking a question about having any sequel due to MS. Also, due to the cross-sectional nature of the study, the efficacy of different CIM modalities was evaluated subjectively. Another limitation of this study is that as the registry system has started its work less than 10 years ago and it records information of patients who are candidate for MS drug therapy, the results may be not representative of patients with more than ten years duration of the disease.

5. Conclusions

CIM, in particular herbal medicines and dietary supplements, is widely used by MS patients, but many do not talk with their conventional physician about that. Therefore, physicians should communicate with patients about CIM use, their potential benefits and probable interactions or side effects. National effort should focus on informing the population about legal CIM institutions and hazards of referring to non-legal ones. Although there is extensive data about using CIM in different diseases, data about objective efficacy and potential interaction and side effects are lacking. Future researches can focus on this point.

What is already known on this subject?

- Previous studies report different complementary and integrative medicine use and its associated factors among multiple sclerosis patients.
- However, no study has used a standard international questionnaire.

What this study adds?

- Almost all multiple sclerosis patients in southern Iran use at least

one complementary and integrative medicine modality.

- Using herbal drugs and dietary supplements are the most common used complementary and integrative medicine type among multiple sclerosis patients.
- Having non-tertiary education, sequel due to multiple sclerosis and being female were associated to some types of complementary and integrative medicine use.

Contributors

Dr Alireza Salehi: Design of the study, questionnaire translation and adaption, Data interpretation, critical revision of the article, approval of the article. Dr Frinaz Farhoudi: Help in designing the study, Data collection, questionnaire translation and adaption, Data interpretation, drafting the article. Mina Vojoud: Data analysis, drafting a part of the article. Dr Hossein Molavi: help in validation of the questionnaire, critical revision of the manuscript.

Provenance and peer review

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Data sharing statement

Used and unused data are available for consultation upon request to the first author.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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