



Complementary and Integrative Medicine Use among Migraine Patients Using a Modified Version of I-CAM- QP: A Cross-Sectional Study

Farinaz Farhoudi^{1,2}, Alireza Salehi^{3*}, Maryam Poursadeghfard⁴, Mohammadali Moghimizadeh^{1,3}, Rasool Hasanabadi^{1,3}, Marjan Sarami³, Farhad Emadi⁴

¹Student Research Committee, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

²Research Center for Traditional Medicine and History of Medicine, Department of Persian Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

³Department of MPH, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

⁴Clinical Neurology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

Received: 1 Jul 2025

Revised: 24 Feb 2026

Accepted: 26 Feb 2026

Abstract

This study aimed to determine the prevalence and associated factors of complementary and alternative medicine (CAM) use among patients with migraine using a culturally-adapted Persian version of the International Complementary and Alternative Medicine Questionnaire (I-CAM-QP). In this cross-sectional study, 310 patients attending two neurology referral clinics were screened. After excluding 66 individuals who did not meet International Classification of Headache Disorders, 3rd edition (ICHD-3) criteria and three incomplete questionnaires, 241 patients with ICHD-3–confirmed migraine were analyzed. The core four domains of the I-CAM-QP were preserved (CAM providers, practitioner-based therapies, herbal/supplement use, and self-help practices). Modifications were limited to contextual adaptation and included the addition of migraine-specific clinical variables, incorporation of locally prevalent Traditional Persian Medicine modalities (e.g., cupping, phlebotomy, leech therapy, lifestyle modification), reinstatement and expansion of provider categories to distinguish physician and non-physician practitioners, and supplementary items assessing disclosure and safety-related aspects of CAM use.

Participants were predominantly female (78.4%), with a mean age of 38.10 ± 10.18 years and mean disease duration of 10.77 ± 8.7 years. Overall, 91.7% reported using at least one CAM modality in the preceding 12 months. Herbal medicines and dietary supplements were most common (86.7%), with herbs alone reported by 68%. Increasing age was independently associated with higher odds of total CAM use among patients with episodic migraine (AOR 1.08; 95% CI 1.00–1.16) and self-help CAM practices (AOR per year increase: 1.03; 95% CI: 1.00–1.06). Greater mean headache pain intensity was independently associated with visiting a CAM provider (AOR 1.22; 95% CI 1.02–1.47). Additionally episodic migraine was associated with self-help practices (AOR: 2.45; 95% CI: 1.22–4.09). CAM use was highly prevalent and largely self-directed, underscoring the need for structured patient–physician communication in routine migraine care.

Keywords: Complementary and alternative medicine; Headache; I-CAM-Q; I-CAM-QP; Migraine headache; Persian medicine

doi <http://doi.org/10.18502/tim.v11i2.22051>

Citation: Farhoudi F, Salehi A, Poursadeghfard M, Moghimizadeh M, Hasanabadi R, Sarami M, et al. **Complementary and Integrative Medicine Use among Migraine Patients Using a Modified Version of I-CAM- QP: A Cross-Sectional Study.** Trad Integr Med 2026;11(2):125-134. <http://doi.org/10.18502/tim.v11i2.22051>

*Corresponding Author: Alireza Salehi

Department of MPH, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

Email: salehialireza45@yahoo.com

Copyright © 2026 Tehran University of Medical Sciences. Published by Tehran University of Medical Sciences. This work is licensed under a



Creative Commons Attribution-NonCommercial 4.0 International license (<https://creativecommons.org/licenses/by-nc/4.0/>). Noncommercial uses of the work are permitted, provided the original work is properly cited.

Introduction

Migraine is a leading cause of disability worldwide and ranks among the most disabling neurological disorders, particularly affecting young adult women [1,2]. It imposes a substantial burden on quality of life, productivity, and healthcare systems [3]. The global prevalence of migraine is estimated at approximately 10%, with higher rates reported in some regions, including Iran (approximately 14%), and a greater prevalence among women and urban populations [4].

Although considerable progress has been made in understanding the pathophysiology of migraine and in developing novel acute and preventive therapies [5,6], its exact etiology remains incompletely understood and no definitive cure exists [5]. Preventive pharmacotherapies are often associated with adverse effects, including mood disturbances, weight changes, cardiovascular effects, and teratogenic risks, which may limit adherence and long-term use [6]. These challenges may contribute to patients' interest in complementary approaches.

The World Health Organization defines traditional, complementary, and alternative medicine (CAM) as diverse health practices that are not fully integrated into conventional healthcare systems [7]. CAM use is widespread globally [8-10] and is used in different fields of medicine [11,12]. Reported motivations include a desire for more holistic care, dissatisfaction with conventional treatments, perceived lower risk of side effects, and a preference for natural or self-directed therapies [12,13]. Chronic conditions, including migraine, are among the most frequently cited reasons for CAM utilization [14]. The prevalence of CAM use among patients with primary headache disorders varies widely, ranging from 26% to 89% depending on study design and measurement tools [15, 16]. Patients employ a broad spectrum of modalities, from herbal and dietary supplements to mind-body and practitioner-based therapies, with heterogeneous levels of supporting evidence [17,18]. However, few studies have applied standardized instruments to assess CAM use in migraine populations, and none have systematically used the International Complementary and Alternative Medicine Questionnaire (I-CAM-Q) in this context [15,19,20]. Moreover, data on CAM utilization among patients with migraine in Iran remain limited.

Therefore, the present study aimed to assess the prevalence and determinants of CAM use among patients with migraine using a culturally adapted version of the I-CAM-Q, in order to generate standardized and policy-relevant data for clinical practice and health planning.

Materials and Methods

Sample size

A minimum sample size of 147 patients with migraine was calculated using Cochran's formula for prevalence studies, assuming a CAM use prevalence of 89.3% based

on prior literature (15), a 5% type I error, and a 95% confidence level. To enhance representativeness and account for an anticipated ~3% rate of invalid questionnaires, a total of 310 patients were targeted for enrollment (10).

Patient recruitment and data collection

This cross-sectional study was conducted between July and September 2022 using a clinic-based consecutive sampling approach. Participants were recruited from two tertiary referral centers for migraine care in Shiraz city in southern part of Iran. All adult patients (≥ 18 years) attending these clinics during the study period were screened and consecutively invited to participate. Eligible participants had a prior clinical diagnosis of migraine established by a neurologist at least one year before the interview.

All participants completed a structured questionnaire, which included items necessary to assess the International Classification of Headache Disorders, 3rd edition (ICHD-3) diagnostic criteria. For the final analysis, only patients fulfilling ICHD-3 criteria based on questionnaire assessment were included. Patients with other neurological disorders, incompatible diagnoses, or incomplete data were excluded.

Data were collected through face-to-face interviews conducted by two trained researchers. Study objectives and procedures were explained, and verbal informed consent was obtained. Information collected included demographic characteristics, migraine-specific clinical features (including type, duration, frequency, and severity over the past three months), and CAM use during the preceding 12 months.

Questionnaire

The International Complementary and Alternative Medicine Questionnaire (I-CAM-Q) was developed in 2006 to standardize the assessment of CAM use across populations [21] and has since been translated and adapted into multiple languages [22-24]. A previously-validated Persian version (I-CAM-QP) was used as the core instrument in this study [23].

The original I-CAM-QP structure was preserved, including its four principal domains: (1) visits to CAM providers, (2) practitioner-applied treatments, (3) herbal and dietary supplement use, and (4) self-help practices. All primary outcome variables related to CAM utilization were derived exclusively from these original domains to ensure comparability with other I-CAM-Q-based studies. Modifications were limited to contextual adaptation and expansion rather than structural alteration. Specifically:

(a) Demographic and migraine-specific clinical variables (ICHD-3 diagnostic criteria, disease duration, headache frequency, and headache pain intensity) were added as separate introductory sections and were analytically distinct from CAM exposure items. A previously validated 11-point numeric rating scale (0-10) was used to assess

mean headache pain intensity over the preceding three months [25].

(b) Locally-prevalent Traditional Persian Medicine (TPM) modalities (e.g., lifestyle modification and blood-letting techniques such as cupping, phlebotomy, and leech therapy) were incorporated to reflect regional practice patterns; while the “spiritual healing” category—rarely practiced by physicians in Iran—was removed.

(c) In the first section (visits to CAM providers), the “physician” provider option—previously omitted in an earlier Persian adaptation—was reinstated to align with the original I-CAM-Q structure. Additionally, provider categories were expanded to distinguish between physician and non-physician TPM practitioners. This modification was implemented to accurately capture real-world care-seeking patterns, as patients may consult non-physician practitioners despite regulatory restrictions.

Open-ended response options were retained in all sections, consistent with the modular design of the original instrument.

Participants reporting visits to CAM providers completed seven supplementary items addressing consultation reasons, disclosure to conventional physicians, perceived adverse effects, expected outcomes, and changes in conventional medication use. These additional items were analyzed descriptively and did not modify the core I-CAM-Q constructs.

Content validity of the adapted questionnaire was assessed through expert panel review involving specialists in neurology, CAM research, and Traditional Persian Medicine. Minor wording refinements were made to enhance clarity and cultural appropriateness. The instrument was subsequently pilot-tested prior to implementation.

Because the core domains, response structure, and CAM classification framework of the original I-CAM-Q were preserved, cross-study comparability at the domain and category levels remains methodologically defensible.

Data analysis

SPSS version 27 was used for all analyses. Descriptive statistics (means, standard deviations, frequencies) summarized participant characteristics. For the herbal and supplement component, SPSS codes were defined according to the 30 most frequently used items; remaining responses were categorized as “other.” Missing data were coded as “1000.”

Binary logistic regression models were used to identify predictors of CAM use overall and within subcategories. Covariates included age, sex, migraine type, headache pain intensity, education level, and disease duration. Backward elimination was applied with entry at $p < 0.05$ and removal at $p > 0.10$. Continuous variables were retained in their original form, and linearity with the logit was assessed. Education was dichotomized as tertiary versus non-tertiary for multivariable modeling. Multicollinearity was evaluated using variance inflation factor

(VIF) diagnostics, with all VIFs < 2 . Interactions between age and migraine type were formally tested and included only if statistically significant. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were reported. Two-sided p values < 0.05 were considered significant.

Ethics

The study adhered to the Declaration of Helsinki and received approval from the Ethics Committee of Shiraz University of Medical Sciences. (Reference number IR.sums.rec.1396.S536).

Consent

Verbal informed consent was obtained from all participants prior to data collection.

Results

Demographic characteristics and health status of patients

A total of 310 patients were initially assessed for eligibility. After exclusion of 66 patients who did not fulfill the ICHD-3 diagnostic criteria based on questionnaire assessment and 3 patients with invalid data, 241 patients with confirmed migraine were included in the final analysis. The mean age of participants was 38.10 ± 10.18 years. As shown in table 1, most of the patients were female (78.4%), married (76.8%), lived in urban areas (86.3%), and had tertiary education (45.6%). The majority of patients were housewives (51.9%) and the most reported income level was at the intermediate level of the community (78%). In most cases subjective perception of the overall health status was good (54.4%). Most patients (71.8%) had episodic migraine and 28.2% had chronic types consistent with ICHD-3 diagnostic criteria. The mean intensity of headache pain during the past three months was 7.97 ± 1.80 .

Overall CAM use

Totally, 221 patients (91.7%) had used at least one category of CAM in the last 12 months. As shown in table 2, the most common CAM category was herbs/supplements ($n=209$; 86.7%) and subsequently self-help practices ($n=73$; 30.3%) and visiting a CAM provider ($n=66$; 27.4%). Herbs/herbal medicine ($n=164$; 68.04%) and vitamins/minerals ($n=160$; 66.39%) were the most popular subcategories of CAM. Total use of CAM without including vitamins/minerals that are generally administered as a part of conventional medicine in Iran was 76.8%.

CAM provider consultations and perceived helpfulness

Among 66 patients who reported visiting a CAM provider during the previous 12 months, 26 (39.39%) had visited herbalists, 22 (33.33%) had visited physicians and 19 (28.78%) had visited traditional therapists. Across provider types, the primary motivation for CAM consulta-

Table 1. Demographic and Clinical Characteristics of Patients with Confirmed Migraine (n = 241)

Characteristic	n (%) or Mean $\pm$ SD
Age (years)	38.10 $\pm$ 10.18
Sex	
Female	189 (78.4)
Male	52 (21.6)
Marital status	
Married	185 (76.8)
Single	44 (18.3)
Other	11 (14.6)
Missing data	1 (0.4)
Place of residence	
Urban	208 (86.3)
Rural	33 (13.3)
Missing data	1 (0.4)
Educational level	
Illiterate/Primary	33 (13.7)
Secondary	98 (40.7)
Tertiary	110 (45.6)
Occupation	
Employed/Retired	91 (37.8)
Unemployed	25 (10.4)
Housewife	125 (51.9)
Household income level	
Low	40 (16.6)
Intermediate	188 (78.0)
High	12 (5)
Missing data	1 (0.4)
Perceived health status	
Good	131 (54.4)
Moderate / Poor	76 (31.5)
Poor	33 (13.7)
Missing data	1 (0.4)
Migraine type (ICHD-3)	
Episodic migraine	173 (71.8)
Chronic migraine	68 (28.2)
Disease duration (years)	10.77 $\pm$ 8.7
Headache pain intensity (past 3 months)	7.97 $\pm$ 1.80

- Values are presented as *mean $\pm$ standard deviation* for continuous variables and *number (percentage)* for categorical variables.
 - Percentages are calculated using the total sample size (n = 241).
 - All participants had a neurologist-diagnosed migraine and met ICHD-3 diagnostic criteria based on the questionnaire assessment.
 - Education was dichotomized as tertiary vs non-tertiary for regression analyses to ensure model parsimony and adequate events-per-variable ratio.
 - Percentages are calculated within each column.
 - Migraine type was classified according to ICHD-3 criteria.
- † Self-help practices include non-provider-based modalities such as relaxation techniques, prayer, yoga, meditation.

tion was long-term illness related to migraine; whereas consultation for acute conditions or non-migraine chronic conditions was uncommon. The perceived helpfulness of the consultation was very helpful in 23.8% of patients visited a physician and 5.3% and 3.8% in patients visited traditional therapists and herbalists respectively. Due

to small sample sizes, less frequently consulted provider categories such as acupuncturists, manual therapists, and energy healers were not analyzed separately.

Among 66 patients who had visited a CAM provider, most patients (n=31, 47%) visited a CAM provider to try any possible treatment method. Patients' expectations from consulting a CAM therapist were mainly the cure of the disease (n=29, 43.9%), reduction of conventional medicine side effects (n=15, 22.7%), and improving their physical status (n=10, 15.2%). The majority of patients (n=44; 68.8%) did not disclosed their visit to CAM providers to their conventional physicians. The main reason was a lack of conventional physician inquiry from patients about CAM use (n=24; 41.4%). Seven patients (10.6%) had experienced side effects. In 15.2% (n=10) of cases, consulting a CAM provider led to decreasing or discontinuing conventional drugs.

CAM treatments provided by physicians

Among 22 patients who reported receiving CAM treatments during physician visits, 15 (68.8%) received herbal therapies, 12 (54.54%) lifestyle modification interventions and 11 (50%) bloodletting techniques. Across all modalities, the primary motivation for CAM use was long-term illness related to migraine, whereas use for acute conditions or non-migraine chronic illnesses was uncommon. A substantial proportion of patients visited a physician, perceived CAM treatments as somewhat or very helpful, particularly for lifestyle modification (50%) and bloodletting techniques (45.5%). Modalities with very low utilization, such as acupuncture, and those not reported by any participant were not analyzed separately due to small sample sizes.

CAM treatments provided by TPM therapists

Eleven patients (61.1%) received herbs and 9 (47.4%) received bloodletting modalities by TPM therapists. The "very helpful" option was chosen by patients only for bloodletting techniques (11.1%).

Herbs/supplements utilization

Herbal medicines and dietary supplements were commonly (n=209, 86.7%) used among patients during the preceding 12 months. Totally, 68% (n=164) of patients reported using at least one herbal medicine, and 66.4% (n=160) reported using vitamins or mineral supplements. The most commonly utilized substances were vitamin D (n=106), borage (n=51), chamomile (n=50) and vitamin B compounds (n=43). The predominant motivation for use was long-term migraine-related symptoms rather than acute illness or non-migraine conditions. Among users, a substantial proportion (45%-62.2%) in each subgroup, perceived these products as somewhat or very helpful. The main reason for the last use was migraine disease for herbs and for dietary supplements was well-being improvement. No participants reported the use of homeopathic remedies.

Table 2. Complementary and alternative medicine (CAM) utilization patterns by migraine type (n = 241)

CAM-related outcome	Total (n = 241) n (%)	Episodic migraine (n = 173) n (%)	Chronic migraine (n = 68) n (%)
Visited any CAM provider (past 12 months)	66 (27.4)	40 (23.1)	26 (38.2)
Used herbal medicines and/or dietary supplements	209 (86.7)	154 (89)	55 (80.9)
Used self-help practices†	73 (30.3)	60 (34.7)	13 (19.1)

- Percentages are calculated within each column.

- Migraine type was classified according to ICHD-3 criteria.

† Self-help practices include non-provider-based modalities such as relaxation techniques, prayer, yoga, meditation.

Table 3. Multivariable backward logistic regression analyses of factors associated with CAM utilization in migraine patients

Predictor	CAM provider visit AOR (95% CI)	p value	Herbal/Supplemental use AOR (95% CI)	p value	Self-help practices AOR (95% CI)	p value
Sex (female vs male)	—	—	—	—	—	—
Age (per year)	—	—	—	—	1.03 (1.00–1.06)	0.021*
Migraine type (ep- isodic vs chronic)	0.54 (0.29–1.00)	0.053	—	—	2.45 (1.22–4.09)	0.011*
Duration of mi- graine (per year)	—	—	—	—	—	—
Headache pain intensity (per unit increase)	1.22 (1.02–1.47)	0.026*	0.79 (0.63–1.01)	0.063	—	—
Education (non-tertiary vs tertiary)	1.80 (0.98–3.31)	0.057	—	—	—	—

- Values are adjusted odds ratios (AORs) with 95% confidence intervals
- Each column represents a separate backward logistic regression model
- * $p < 0.05$ considered statistically significant
- AOR: adjusted odds ratio; CI: confidence interval
- Reference categories were male sex, chronic migraine, and tertiary education
- Only predictors retained in the final regression models are shown

Self-help practices

Self-help and mind–body practices were reported by a 30.3% (n=73) of patients. Praying for one's own health was the most frequently reported practice (n=69); while other practices such as meditation, yoga, visualization, and relaxation techniques were reported by relatively few patients. Prevention was the most important reason for praying. Due to the low prevalence of other individual practices, detailed subgroup analyses were not performed.

Association of CAM use with independent factors

A significant interaction between age and migraine type

was observed only for total CAM use ($p=0.022$); therefore, stratified analyses were performed for this outcome. In stratified analyses, increasing age was independently associated with higher odds of total CAM use among patients with episodic migraine (AOR: 1.08; 95% CI: 1.00–1.16); whereas no significant association was observed among patients with chronic migraine.

As shown in table 3, higher headache pain intensity was independently associated with greater odds of visiting CAM providers (AOR per unit increase: 1.22; 95% CI: 1.02–1.47). Patients with episodic migraine showed a borderline lower likelihood of CAM provider visits com-

pared with those with chronic migraine (AOR: 0.54; 95% CI: 0.29–1.00). Educational level showed a borderline association with visiting a CAM provider, with patients having non-tertiary education demonstrating higher odds compared with those with tertiary education (AOR: 1.80; 95% CI: 0.98–3.31). No variables were independently associated with herbal or supplemental CAM use in the final adjusted model, although higher headache pain intensity showed a non-significant inverse trend. Increasing age was significantly associated with self-help CAM practices (AOR per year increase: 1.03; 95% CI: 1.00–1.06). In addition, patients with episodic migraine were more than twice as likely to report self-help practices compared with those with chronic migraine (AOR: 2.45; 95% CI: 1.22–4.09).

Discussion

Total CAM use

More than 90% of participants reported using at least one CAM modality during the preceding 12 months, indicating a very high prevalence of CAM utilization among patients with migraine. This rate is comparable to findings from Kuruvilla et al., who reported 89.3% CAM use among individuals with migraine in the United States. Although that study did not employ the I-CAM-Q instrument, conceptual similarities existed in the assessment of practitioner-based therapies, nutraceuticals, and self-help modalities [16].

High CAM utilization has also been documented in other chronic neurological conditions. In our previous study among patients with multiple sclerosis, 99.3% reported using at least one CAM modality [23]. Similarly, studies in mitochondrial disease and other chronic disorders report CAM use exceeding 80–90% [26–28]. These consistently high rates across chronic illnesses suggest that CAM use may be driven not only by disease-specific factors but also by the broader experience of living with long-term, symptom-burdening conditions.

However, international comparisons require careful cultural interpretation. In India and Malaysia, reported CAM use among migraine patients has been lower (approximately 64–66%), likely reflecting differences in study instruments and conceptual definitions of CAM. Studies that assess CAM solely for migraine symptom relief typically yield lower prevalence estimates than those capturing overall CAM use across health domains [29,30].

Cultural context also plays a critical role. In Iran and other Middle Eastern settings, traditional medicine systems—including TPM—remain socially embedded and widely accessible. Herbal remedies are culturally normalized, frequently available without prescription, and often perceived as natural and safe. Furthermore, the I-CAM-Q captures self-help practices such as prayer, which may substantially increase prevalence estimates in religious societies. Therefore, global prevalence differences like-

ly reflect a combination of methodological variation and culturally shaped healthcare behaviors rather than true epidemiological disparities alone.

Most common CAM modalities

Herbal medicines and dietary supplements were the most frequently reported CAM modalities in the present study, with herbal products constituting the dominant component. This pattern aligns with findings from I-CAM-Q-based population studies in Norway, Sweden, and China, all of which identified herbal medicines and dietary supplements as the most prevalent CAM category [10,31,32]. Similar results about herbs/herbal products have been reported in chronic disease populations within comparable sociocultural contexts. Studies conducted in Iran among patients with diabetes and in Ethiopia among older adults with chronic illnesses likewise identified herbal therapies as the leading CAM modality [33,34].

Nevertheless, cross-national variability persists. In some Western populations, mind–body interventions or manipulative therapies predominate [35]. Such variation likely reflects differences in cultural traditions, regulation of herbal products, integration of CAM within health systems, cost considerations, and public trust in conventional medicine. In settings where traditional herbal medicine is historically integrated into healthcare culture, biologically based therapies may represent the default form of CAM engagement.

These findings underscore the importance of interpreting CAM modality distribution within local healthcare ecosystems rather than assuming universal patterns.

CAM use and associated factors

The present study demonstrated domain-specific predictors of CAM use, emphasizing that CAM is not a homogeneous construct.

Age and migraine type interaction

For total CAM use, a significant interaction between age and migraine type was observed. Increasing age was associated with higher odds of CAM use among patients with episodic migraine, whereas no such association was found among those with chronic migraine.

This finding highlights the importance of effect modification in CAM research. Predictors of CAM utilization may vary not only by migraine subtype, but also across the life course. Population-based research suggests that age influences CAM uptake in a non-linear and modality-specific manner. Middle-aged adults often report higher overall CAM use; while younger individuals may favor mind–body practices [28,36]. The current findings extend this literature by demonstrating that age-related patterns may differ by migraine subtype, suggesting nuanced behavioral adaptations to disease burden over time.

Headache pain intensity and provider-based

CAM

Higher headache pain intensity independently predicted visiting a CAM provider. This association is clinically plausible: individuals experiencing more intense symptoms may seek additional practitioner-based interventions when conventional treatment is perceived as insufficient. Previous migraine research and national survey analyses have demonstrated that greater symptom burden and functional impairment are associated with increased CAM engagement [37,38]. Our results refine this understanding by showing that severity appears particularly relevant for practitioner-based CAM rather than self-administered modalities.

Migraine type and modality choice

In the present study, patients with episodic migraine were less likely to visit CAM providers (borderline significance) but were significantly more likely to engage in self-help CAM practices compared with those with chronic migraine. This pattern may reflect differences in disease burden and perceived therapeutic need. Chronic migraine is consistently associated with greater disability, higher headache frequency, increased comorbidity, and substantially greater healthcare utilization compared with episodic migraine [39,40]. Previous research indicates that patients with more severe or frequent migraine are more likely to seek additional or adjunctive therapies, including CAM [37,41]. Higher levels of disability and treatment refractoriness in chronic migraine may, in turn, drive patients toward practitioner-based or multimodal therapeutic approaches, including complementary providers.

In contrast, individuals with episodic migraine may perceive their condition as more manageable and therefore prefer self-directed strategies such as relaxation techniques, exercise, or lifestyle modification. Mind-body and self-care approaches have been widely reported among patients with less disabling headache patterns and those seeking adjunctive symptom control [42].

This modality-specific differentiation supports the conceptual distinction between practitioner-based and self-care CAM domains described in the I-CAM-Q framework [21], suggesting that these categories may reflect distinct motivational and behavioral pathways rather than a single unified construct of CAM use.

Education

Educational level showed a borderline association with visiting CAM providers, with individuals having non-tertiary education more likely to report provider-based CAM use.

Evidence regarding education and CAM use is mixed internationally. In several low- and middle-income countries, lower education has been associated with greater CAM use [43,44]; whereas in high-income countries higher education is often positively associated with CAM

engagement [31, 36,45]. These contrasting patterns may reflect differences in health literacy, access to regulated integrative services, trust in biomedical systems, and socioeconomic barriers.

Sex

Although previous studies frequently report higher CAM use among women [10,36,45], sex was not independently associated with any CAM category in the adjusted models. Given the natural female predominance in migraine epidemiology [1], the absence of an independent sex effect suggests that observed gender differences in prior research may largely reflect underlying clinical or behavioral variables rather than sex itself.

Within a specialist clinic population—where health-care-seeking behavior is already established—sex-based differences may be attenuated after adjustment for disease characteristics.

Disclosure of CAM use

A substantial proportion of patients (68.8%) did not disclose visits to CAM providers to their conventional physicians. This finding is consistent with prior studies [23,37] and a systematic review indicating that nondisclosure of complementary medicine use remains common, with pooled estimates frequently exceeding 50% [46]. Contemporary evidence suggests that the most commonly reported reason for nondisclosure is the absence of physician inquiry, rather than intentional concealment [46,47]. However, disclosure patterns vary across healthcare settings. Some other studies indicated that disclosing CAM use is much more common among patients with chronic diseases (62.7%-79.5%) [48,49].

These findings indicate that disclosure behavior is influenced by physician communication style, perceived openness toward CAM, and broader health system integration. In sociocultural contexts where herbal remedies are perceived as routine or harmless, patients may not consider disclosure necessary. Conversely, some may anticipate negative physician attitudes toward CAM.

Given the high prevalence of herbal and supplement use, nondisclosure carries potential safety implications, including drug-herb interactions and delayed conventional treatment escalation. Proactive, nonjudgmental inquiry about CAM use should therefore be incorporated into routine migraine care.

Limitations

Several limitations should be considered when interpreting the findings. First, participants were recruited from tertiary referral headache clinics, which may limit generalizability to the broader population of individuals with migraine. Patients attending referral centers are more likely to have severe, chronic, or treatment-resistant disease, which may influence health-seeking behaviors and potentially overestimate the prevalence of CAM use,

particularly provider-based modalities. However, this setting also provides valuable insight into CAM utilization among patients actively engaged in specialized migraine care.

Second, CAM use was assessed through self-report using a 12-month recall period. This approach may have introduced recall bias, especially for intermittent, short-term, or less salient CAM modalities, leading to possible misclassification or underreporting.

Third, although migraine type was categorized as episodic or chronic, further stratification of chronic migraine according to clinical severity indicators—such as disability scores, headache-related functional impairment, or medication overuse—was not performed. The absence of such stratification may have obscured heterogeneity in CAM utilization patterns within the chronic migraine subgroup. Finally, the cross-sectional design limits causal inference. The identified associations reflect correlations and do not establish temporal or directional relationships between migraine characteristics and CAM use. Residual confounding from unmeasured factors, including socioeconomic status, cultural beliefs, and healthcare access, cannot be excluded.

Clinical and policy implications

The high prevalence of CAM use, particularly self-administered herbal and dietary supplements, has important clinical and policy implications. In routine migraine care, clinicians should proactively and systematically inquire about CAM use, given the substantial rate of nondisclosure observed. Familiarity with commonly used local herbal products and their potential pharmacological interactions is essential to enhance patient safety. Incorporating shared decision-making approaches may also help patients critically evaluate the evidence supporting various complementary modalities and facilitate informed, integrative treatment planning.

At the policy level, the development of evidence-based guidelines for integrative migraine management is warranted. Strengthening regulatory oversight of herbal and supplemental products is necessary to ensure quality control, standardization, and safety monitoring. Public education initiatives may further promote awareness regarding the importance of disclosure and the potential risks of unsupervised use. In addition, integrating validated complementary therapies into formal healthcare systems could reduce reliance on unregulated providers and improve coordinated care. Future longitudinal studies are needed to examine patterns of CAM adoption over time and to evaluate whether integrative approaches influence clinical outcomes, patient satisfaction, or healthcare utilization.

Conclusions

CAM use is highly prevalent among patients with migraine, with a predominance of self-administered herbal

and supplemental modalities. While most participants did not report adverse effects, the widespread and often undisclosed use of such therapies highlights the need for proactive clinician engagement and regulatory oversight. Predictors of CAM utilization vary by migraine subtype, symptom severity, and age, emphasizing the importance of domain-specific analyses. Integrating culturally informed, evidence-based approaches into migraine management may enhance patient safety and optimize comprehensive care.

Conflict of Interests

The authors declare that they have no conflict of interest.

Acknowledgments

This study was funded by Shiraz University of Medical Sciences (reference number: 12123).

References

- [1] Steiner TJ, Stovner LJ, Jensen, Uluduz RD, Katsarava Z, et al. Migraine remains second among the world's causes of disability, and first among young women: findings from GBD 2019. *J Headache Pain* 2020;21:1-4.
- [2] Feigin VL, Vos T, Alahdab F, Amit AML, Bärnighausen TW, et al. GBD 2017 US neurological disorders collaborators. burden of neurological disorders across the US from 1990-2017: a global burden of disease study. *JAMA Neurol* 2021;78:165-176.
- [3] Gantenbein AR, Agosti R, Kamm CP, Landmann G, Meier N, et al. Swiss quality of life and healthcare impact assessment in a real-world erenumab treated migraine population (square study): interim results. *J Headache Pain* 2022;23:1-10.
- [4] Woldeamanuel YW, Cowan RP. Migraine affects 1 in 10 people worldwide featuring recent rise: a systematic review and meta-analysis of community-based studies involving 6 million participants. *J Neurol Sci* 2017;372:307-315.
- [5] Liu X, Yang W, Zhu C, Sun S, Wu S, et al. Toll-like receptors and their role in neuropathic pain and migraine. *Mol Brain* 2022;15:1-9.
- [6] Martelletti P, Luciani M, Spuntarelli V, Bentivegna E. Deprescribing in migraine. *Expert Opin Drug Saf* 2021;20:623-625.
- [7] Traditional, Complementary and Integrative Medicine. Available from https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1. [Accessed 8 September 2020].
- [8] Xu J, Zhang Y. Traditional Chinese medicine treatment of COVID-19. *Complement Ther Clin Pract* 2020;39:101165.
- [9] Yazdi N, Salehi A, Vojoud M, Sharifi MH, Hoseinkhani A. Use of complementary and alternative medicine in pregnant women: A cross-sectional survey in the south of Iran. *J Integr Med* 2019;17:392-395.
- [10] Kristoffersen AE, Quandt SA, Stub T. Use of complementary and alternative medicine in Norway: a cross-sectional survey with a modified Norwegian version of the international questionnaire to measure use of complementary and alternative medicine (I-CAM-QN). *BMC Complement Med Ther* 2021;21:1-12.
- [11] Farhoudi F, Zohalinezhad ME, Zarshenas MM, Masoudi N, Abarghoeei EF, et al. Possible protective effect of *Zataria mul-*

- tiflora* Boiss. on salivary glands in patients with differentiated thyroid carcinoma treated with radioiodine: A randomized, double-blind, placebo-controlled clinical trial. *Iran J Nucl Med* 2024;32:16.
- [12] Ashraf H, Salehi A, Sousani M, Sharifi MH. Use of complementary alternative medicine and the associated factors among patients with depression. *Evid Based Complement Alternat Med* 2021;1.
 - [13] Kristoffersen AE, Stub T, Musial F, Fønnebo V, Lillenes O, et al. Prevalence and reasons for intentional use of complementary and alternative medicine as an adjunct to future visits to a medical doctor for chronic disease. *BMC Complement Alternat Med* 2018;18:1-8.
 - [14] Steel A, McIntyre E, Harnett J, Foley A, Adams J, et al. Complementary medicine use in the Australian population: Results of a nationally-representative cross-sectional survey. *Sci Rep* 2018;8:1-7.
 - [15] Korucu O, Atasoy HT, Demiryürek BE, Emre U, Taşçılar FN, et al. The use of complementary and alternative treatment in headache patients. *Gazi Med J* 2018;29:183-186.
 - [16] Kuruvilla DE, Mehta A, Ravishankar N, Cowan RP. A patient perspective of complementary and integrative medicine (CIM) for migraine treatment: a social media survey. *BMC Complement Med Ther* 2021;21:1-7.
 - [17] Polat B, Saatci O, Yilmaz NH, Duz OA. The frequency of complementary and integrative medicine methods in headache patients and their spending habits. *Neurologia i Neurochirurgia Polska* 2018;52:347-351.
 - [18] Patel PS, Minen MT. Complementary and integrative health treatments for migraine. *J Neuroophthalmol* 2019;39:360-369.
 - [19] Göksel BK, Coşkun Ö, Ucler S, Karatas M, Ozge A, et al. Use of complementary and alternative medicine by a sample of Turkish primary headache patients.
 - [20] Al-Hashel JY, Ahmed SF, Alshawaf F, Alroughani R. Use of traditional medicine for primary headache disorders in Kuwait. *J Headache Pain* 2018;19:1-7.
 - [21] Quandt SA, Verhoef MJ, Arcury TA, Lewith GT, Steinsbekk A, et al. A Development of an international questionnaire to measure use of complementary and alternative medicine (I-CAM-Q). *J Altern Complement Med* 2009;15:331-339.
 - [22] Esteban S, Vázquez Peña F, Terrasa S. Translation and cross-cultural adaptation of a standardized international questionnaire on use of alternative and complementary medicine (I-CAM - Q) for Argentina. *BMC Complement Alternat Med* 2016;16:1-7.
 - [23] Farhoudi F, Salehi A, Vojoud M, Molavi Vardanjani H. 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. *Complement Ther Med* 2019;46:47-53.
 - [24] Druart L, Pinsault N. The I-CAM-FR: a french translation and cross-cultural adaptation of the I-CAM-Q Medicines 2018;5:72.
 - [25] Jones CW, Remboski LB, Freeze B, Braz VA, Gaughan JP, et al. Intravenous fluid for the treatment of emergency department patients with migraine headache: a randomized controlled trial. *Ann Emerg Med* 2019;73:150-156.
 - [26] Franik S, Huidekoper HH, Visser G, Vries M de, Boer L de, et al. High prevalence of complementary and alternative medicine use in patients with genetically proven mitochondrial disorders. *J Inherit Metab Dis* 2015;38:477-482.
 - [27] Santiago-García AP, Gamez-Nava JI, Avalos-Salgado FA, Cerpa-Cruz S, Amaya-Cabrera EL, et al. Complementary therapies and their association with problems in therapeutic adherence to conventional synthetic DMARDs in rheumatoid arthritis: A cross-sectional study. *Healthcare (Basel)* 2023;11.
 - [28] Cevik C, Selcuk KT. Prevalence and correlates of the use of complementary and alternative medicine in adults living in a rural area. *Holist Nurs Pract* 2019;33:36-44.
 - [29] Tai M-LS, Yap JF, Chin HL, Tan CT, Goh CBJNA. Complementary and alternative medicine for migraine and tension-type headache among the Malaysians. *Neurol Asia* 2020;25.
 - [30] Sadiq S, Singh BP, Kalsotra M, Bhagat V, Choudhary S. Complementary and alternative medicines use among adults with migraine in a tertiary care hospital: An observational study. *Natl J Physiol Pharm Pharmacol* 2022;12:737-737.
 - [31] Wemrell M, Merlo J, Mulinaria S, Hornborgd AC. Two-thirds of survey respondents in southern Sweden used complementary or alternative medicine in 2015. *Complement Med Res* 2017;24:302-309.
 - [32] Chung VC, Ma PH, Wang HH, Wang JJ, Hong LC, et al. Integrating traditional Chinese medicine services in community health centers: insights into utilization patterns in the pearl river region of China. *Evid Based Complement Alternat Med* 2013;2013.
 - [33] Hashempur MH, Heydari M, Mosavat SH, Heydari ST, Shams M. Complementary and alternative medicine use in Iranian patients with diabetes mellitus. *J Integr Med* 2015;13:319-325.
 - [34] Ayele AA, Tegegn HG, Haile KT, Belachew SA, Mersha AG, et al. Complementary and alternative medicine use among elderly patients living with chronic diseases in a teaching hospital in Ethiopia. *Complement Ther Med* 2017;35:115-119.
 - [35] Lee J, Bhowmick A, Wachholtz A. Does complementary and alternative medicine (CAM) use reduce negative life impact of headaches for chronic migraineurs? A national survey. *SpringerPlus* 2016;5:1-10.
 - [36] Mulder LTC, Busch M, Kristoffersen AE, Hök Nordberg J, van der Werf ET. Prevalence and predictive factors of complementary medicine use during the first wave of the COVID-19 pandemic of 2020 in the Netherlands. *BMC Complement Med Ther* 2022;22:1-10.
 - [37] Makarevičius G, Dapkutė A, Ryliškienė K. Complementary and alternative medicine use in migraine patients: Results from a national patient e-survey. *Front Neurol* 2024;15:1378532.
 - [38] Drieskens S, Tafforeau J, Demarest S. Do sociodemographic characteristics associated with the use of CAM differ by chronic disease? *Eur J Public Health* 2019;29:655-660.
 - [39] Buse DC, Manack AN, Fanning KM, Serrano D, Reed ML, et al. Chronic migraine prevalence, disability, and sociodemographic factors: Results from the American Migraine Prevalence and Prevention Study. *Headache* 2012;52:1456-1470.
 - [40] Natoli JL, Manack A, Dean B, Butler Q, Turkel CC, et al. Global prevalence of chronic migraine: A systematic review. *Cephalalgia* 2010;30:599-609.
 - [41] Rossi P, Di Lorenzo G, Malpezzi M, Faroni J, Cesarino F, et al. Prevalence, pattern and predictors of use of complementary and alternative medicine (CAM) in migraine patients attending a headache clinic in Italy. *Cephalalgia* 2005;25:493-506.
 - [42] Wells RE, Bertisch SM, Buettner C, Phillips RS, McCarthy EP. Complementary and alternative medicine use among adults with migraines/severe headaches. *Headache* 2011;51:1087-

- 1097.
- [43] James PB, Wardle J, Steel A, Adams J. Traditional, complementary and alternative medicine use in Sub-Saharan Africa: A systematic review. *BMJ Glob Health* 2018;3:e000895.
- [44] de Moraes Mello Boccolini P, Siqueira Boccolini C. Prevalence of complementary and alternative medicine (CAM) use in Brazil. *BMC Complement Med Ther* 2020;20:1-10.
- [45] Judson PL, Abdallah R, Xiong Y, Ebbert J, Lancaster JM.. Complementary and alternative medicine use in individuals presenting for care at a comprehensive cancer center. *Integr Cancer Ther* 2017;16:96-103.
- [46] Foley H, Steel A, Cramer H, Wardle J, Adams J. Disclosure of complementary medicine use to medical providers: A systematic review and meta-analysis. *Sci Rep* 2019;9:1573.
- [47] Jou J, Johnson PJ. Nondisclosure of complementary and alternative medicine use to primary care physicians: Findings from the 2012 National Health Interview Survey. *JAMA Intern Med* 2016;176:545-546.
- [48] Foley H, Steel A, McIntyre E, Harnett J, Sibbritt D, et al. Disclosure of conventional and complementary medicine use to medical doctors and complementary medicine practitioners: A survey of rates and reasons amongst those with chronic condi-