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Original Research Article

The knowledge, attitude, practice and predictors of complementary and alternative medicine use among type 2 diabetes mellitus patients in Indonesia

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ABSTRACT

Objective: The prevalence of complementary and alternative medicine (CAM) usage among patients with type 2 diabetes mellitus (T2DM) in Indonesia is high. However, to date, little is known about why Indonesian T2DM patients choose CAM therapies, how their knowledge, attitude and practice (KAP) of CAM affects their choices, or how demographics correlate with patient choices. Therefore, this study aimed to investigate the KAP and predictors of CAM usage in T2DM patients in Indonesia.

Methods: This was an observational, cross-sectional study. Patients were interviewed using a questionnaire. Chi-square tests or Fisher's exact tests were used to compare demographic and clinical data, as well as KAP assessments, between T2DM patients who use and do not use CAM. Multivariate logistic regression analyses were used to investigate predictors of CAM usage.

Results: A total of 628 T2DM patients were enrolled in the study. CAM therapies were used by 341 patients (54.3%). The most common therapies were herbs and spiritual healing, used by 100.0% and 68.3% of CAM-using patients, respectively. CAM therapies were frequently recommended by family members (91.5%), and CAM users had significantly more knowledge and more positive attitudes toward CAM therapies than nonusers. Among users, 66% said they would not follow their healthcare providers' instructions to not use CAM therapies, and 69.5% said they would not disclose their plan to use CAM therapies with their healthcare provider. Neither demographic nor clinical characteristics were associated with CAM use. The factors that best predicted the use of CAM therapies were their availability and low cost (odds ratio [OR] = 4.59; 95% confidence interval [CI]: 3.01–7.01), the belief that CAM therapies were safe (OR = 2.04; 95% CI: 1.40–2.95), the belief that CAM therapies could help with diabetes control (OR = 1.75; 95% CI: 1.15–2.66), and the belief that CAM therapies could help maintain physical health (OR = 1.68; 95% CI: 1.13–2.49).

Conclusion: CAM therapy users were more knowledgeable and had more positive attitudes toward CAM, but most of them chose not to disclose their CAM use to their healthcare providers. CAM use in Indonesia was associated with its accessibility, affordability, safety and effectivity, but not with any demographic or clinical characteristics. This study provided new evidence and insights for nurses and physicians in Indonesia that will help to design educational programs about the safety and efficacy of CAM therapies.

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1. Introduction

Diabetes mellitus (DM) is a chronic disease whose prevalence is increasing all over the world. Indonesia is among the ten countries with the highest DM rates, with 10,681,400 DM patients in 2019 [1]. That number is expected to rise to 21,257,000 by 2030 [2]. DM

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cannot be cured, but it can be managed with lifestyle activities that help to maintain patients' blood glucose within the normal range. Such lifestyle activities include diet management, exercise, blood glucose monitoring and medication. Modern medications used to control blood glucose levels include oral glucose-lowering drugs and insulin therapy [3]. However, many people with DM are dissatisfied with these drugs and turn to complementary and alternative medicine (CAM) to improve their symptoms [4,5]. A previous study showed that patients with DM are 1.6% more likely to use CAM therapies than those without DM [6]. The prevalence of CAM usage in DM patients varies among countries, with 26.2% in the United States [7], 62.5% in Malaysia [8], 17% in the United Kingdom [9], 46.3% in Australia [10] and 67.7% in India [11].

Previous studies have shown that a number of CAM therapies, when used correctly, help to manage DM by decreasing blood glucose levels [12–14]. However, most DM patients do not consult their healthcare providers before using CAM therapies [15–18]. A recent study conducted in Saudi Arabia showed that almost half of patients using CAM were unaware of whether the product was safe or effective [19]. CAM therapies should be checked for quality, safety and efficacy before use, since improper application can cause poor glycemic control and increase disease severity [20].

The prevalence of CAM usage in DM patients in Indonesia is 46.7% [21]. The most commonly used CAM therapies are herbs (54.4%), ceragem (16.7%) and massage (12.3%) [22]. Another study showed the most popular CAM therapies for DM patients in Indonesia were herbs (100%), mind-body intervention (94.2%), and manipulation and body-based methods (19.5%) [23].

Studies show that type 2 DM (T2DM) patients need to use CAM therapies cautiously, since improper use can potentially increase the severity and complications of their disease [20]. Healthcare providers need to understand their patients' knowledge and attitudes toward CAM therapies in order to create programs that improve patient awareness, regarding safety issues, efficacy and potential interactions of the most commonly used CAM therapies. To date, no study has investigated the knowledge, attitude and practice (KAP) of CAM in T2DM patients in Indonesia. Therefore, the first purpose of this study was to explore the KAP of CAM usage in T2DM patients in Indonesia.

Studies in other Asian countries, including Thailand, Malaysia, Saudi Arabia and Pakistan, have revealed that demographic factors such as older age [19,24], being married [25], being Muslim [8], being unemployed [19], being female [26], graduating from higher education [26] and earning low income [26], and clinical factors, such as longer duration of DM and number of diabetes-related complications, are predictors of CAM usage in T2DM patients [25]. Other studies have shown that knowledge, a lack of trust in pharmaceutical products, poor patient-healthcare provider relationships, beliefs about CAM safety and effectivity, and CAM availability and affordability are also predictors of CAM usage in various Asian and developing countries [19,27]. However, to date, no study has investigated the predictors of CAM usage in T2DM patients in Indonesia. Therefore, the second purpose of our study was to investigate the predictors of CAM usage in T2DM patients in Indonesia.

Based on the predictors found in previous studies, we hypothesized that demographical and clinical characteristics might be predictors of CAM usage in T2DM patients in Indonesia. CAM therapies have historically been used in Indonesia, and beliefs about their safety and effectivity are firmly rooted in the culture. Therefore, we also hypothesized that beliefs about the safety and effectivity of CAM products might be another predictor of CAM use in the country. Since previous studies in developing and Asian countries have found that knowledge, lack of trust in pharmaceutical products, poor patient-healthcare provider relationships, and CAM cost and availability were predictors of CAM usage, we investigated whether these factors are predictors of CAM usage in Indonesia. Understanding the KAP and the predictors for CAM usage is important for healthcare providers in Indonesia, since it will provide evidence that clinicians can use to develop educational programs that address CAM usage among T2DM patients.

2. Material and methods

2.1. Study design and sample size

A cross-sectional study was carried out on T2DM patients registered at 16 primary health centers in Banyumas Regency, Indonesia, between August 2nd and November 20th, 2020. Participants were selected using a convenience sampling method. Patients who visited primary health centers in Banyumas Regency between August 2nd and November 20th and met the inclusion criteria were recruited. They were approached in clinic waiting rooms, and all those who agreed to the terms and signed the informed consent forms were included. Since patients had limited time in the clinics, their contact information was recorded, and the interviews were conducted in patients' homes at a time that suited them.

The sample size was calculated by assuming a 46.7% prevalence of CAM usage, based on a previous study [21], a 4% desired precision, 95% confidence interval (CI), and an anticipated nonresponse rate of 5%. Thus, the calculated minimum sample size (n) was 628 patients. The following formula was used to calculate the sample size [28]: $n = Z^2_{1-\alpha/2}P(1-P)/e^2$, where n is number of patients, $Z^2 = (1.96)^2$ for a 95% CI, P is the estimate of prevalence based on previous study, and e is desired precision (4%).

2.2. Ethical issue

This study was approved by the research ethics committee of the Faculty of Health Sciences, Universitas Jenderal Soedirman, Indonesia (164/EC/KEPK/2020). All participants were informed about the purpose of the study, the procedures and their rights, and all participants provided verbal and written informed consent.

2.3. Inclusion and exclusion criteria

The inclusion criteria were patients who were aged 18 years and above, who had been diagnosed as having T2DM by a physician, and who could read and write in the Indonesian language. The exclusion criteria were patients with intellectual or cognitive disabilities and those who were unable to read and write. Researchers identified patients eligible for this study from medical records. Face-to-face interviews were conducted in participants' homes, with each interview taking approximately 20–30 min to complete.

2.4. Questionnaires

Participants completed a self-report questionnaire that included both demographic and clinical data, including information on age, gender, marital status, religion, education level, income, employment status, duration of T2DM, medication, diabetes-related complications, and comorbidity. The questionnaire was based on one used to assess the KAP of CAM by Al-Eidi et al. [19], and permission to use it was obtained from the author. The original English language questionnaire was translated and back-translated by two professional translators, each of whom was working independently. The experts in CAM and DM confirmed its face and content validity. It was then pilot tested on a sample of 30 subjects. The knowledge domain consisted of three questions about whether participants had heard of CAM products, and the efficacy and safety of CAM. The attitude domain consisted of four questions related to whether patients would follow healthcare provider advice if instructed not to

use CAM, whether patients would advise their family members diagnosed with DM to use CAM, whether patients would discuss CAM usage with their healthcare providers, and whether patients would agree to combine CAM with modern T2DM medication. Eight questions covered patients' reasons for using CAM, expanding on the original questionnaire's seven. Our study added one question, based on the pilot study, related to whether CAM can help maintain physical health. The practice domain consisted of one question about CAM usage. Participants who said they used CAM were asked about the type of CAM and their CAM prescribers.

2.5. Data analyses

The statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS, Version 23, IBM, USA). Frequency and percentages were calculated for categorical variables. A Chi-square test or Fisher's exact test was used to investigate the associations between demographic factors or clinical data and KAP of CAM. Variables with a *P*-value < 0.25 in the univariate analysis were entered into multivariate logistic regression analyses. Variables with a *P*-value < 0.05 was considered statistically significant.

3. Results

3.1. Demographic data

A total of 628 patients were enrolled in the study, with a response rate of 100%. The data (Table 1) showed no difference between those who did and did not use CAM in all aspects of the demographic data and clinical characteristics, including gender, marital status, religion, age, education, employment status, income, duration of T2DM, type of anti-diabetic medication, complications related to DM, and comorbidities. Further, neither demographics nor clinical characteristics were associated with CAM usage in T2DM patients in Indonesia.

3.2. Knowledge, attitude and reasons for using CAM

Table 2 shows the knowledge, attitude and reasons for using CAM for users and nonusers. CAM users were 3.6 times more likely ($P < 0.001$) to have heard about CAM than nonusers. CAM users were also 4.6 times more likely ($P < 0.001$) to view CAM therapies as safe and effective than nonusers. Regarding attitude, CAM users were more likely than nonusers ($P < 0.001$) to advise family members with T2DM to use CAM therapies and to combine CAM therapies with conventional medicine. Most users (66%) would not follow their healthcare provider's advice if they were instructed not to use CAM therapies and 69.5% would not disclose their plan to use CAM therapies with their healthcare providers. CAM users were almost 6 times (odds ratio [OR]: 5.88) more likely than nonusers to reported that CAM therapies were easily available and inexpensive. They were also more likely to report ($P < 0.001$) that CAM therapies had fewer side effects than pharmaceutical drugs, could help diabetes control, and could maintain physical health. CAM usage was not statistically associated with waiting times for medical appointments, lack of trust in pharmaceutical drugs, poor physician-patient communication, or doctor-suggested CAM use.

3.3. Use of CAM in T2DM patients

Table 3 shows that 54.3% of participants used CAM. Among CAM users, the most popular products were herbal products (100%), spiritual healing (68.3%), medical massage (42.3%) and honeybee products (39.0%). These CAM products were recommended by family members (91.5%), friends of patients (74.8%) or pharmacists (50.4%).

3.4. Logistic regression

The logistic regression analysis (Table 4) revealed the predictors for CAM usage to be as follows: the beliefs that "CAM therapies are safe" (OR = 2.04; 95% CI: 1.40–2.95), "CAM therapies are easily available and inexpensive" (OR = 4.59; 95% CI: 3.01–7.01), "CAM therapies can help diabetes control" (OR = 1.75; 95% CI: 1.15–2.66), and "CAM therapies can maintain physical health" (OR = 1.68; 95% CI: 1.13–2.49). Demographic and clinical data were not predictors of CAM usage.

4. Discussion

This is the first study in Indonesia to investigate KAP and predictors of CAM usage in T2DM patients in Indonesia. The main finding of our study was that there were four factors which predicted CAM usage for people with T2DM in the country. The factors were as follows: the fact that "CAM therapies are easily available and inexpensive," and the beliefs that "CAM therapies are safe," "CAM therapies can help control diabetes," and "CAM therapies can help maintain physical health." Our findings show that CAM usage in Indonesia is more related to its cost, availability, safety and effectiveness than any demographic or clinical characteristic of patients. These findings give new insight to healthcare providers in Indonesia about the need to establish an education program for T2DM patients related to CAM usage.

We found that CAM users had more knowledge and positive attitudes towards CAM therapies than nonusers. Our study also showed that most CAM users would not follow their healthcare provider's recommendations if instructed not to use CAM therapies, and that they would not discuss their use of CAM therapies with their healthcare providers. These findings are consistent with studies that took place in Saudi Arabia and Pakistan [19,27], both of which showed most of patients choose not to discuss their CAM usage with their healthcare providers. The reason why Indonesian patients choose not to disclose such information with their healthcare providers needs to be further investigated. The possible reasons are patients' lack of trust in their healthcare providers or because healthcare providers do not ask their patients about their CAM usage, perhaps because healthcare providers have very little time with each patient.

The most frequently used CAM in this study was herbal therapy. A previous study showed that the most commonly used herbs were *Syzygium polyanthum*, *Annona muricata* and *Garcinia mangostana*, all of which are believed to help reduce blood glucose [23]. In contrast, a study in another country found that the most popular CAM therapies were nutritional supplements [29]. The reasons why herbal remedies are so popular among participants in our study are probably that herbal use is deeply rooted in Indonesian culture, which are easily accessible and affordable, and patients can grow them themselves.

The strongest predictor of CAM usage was the belief that CAM is accessible and affordable. Many patients in Indonesia have limited access to healthcare services and live without health insurance. For these reasons they may be more likely to consider CAM therapies as positive and affordable choices. A previous study showed that when conventional medicine was unaffordable, DM patients might use CAM therapies instead [30]. Our findings corresponded with those of another previous study conducted in Pakistan, which found that many DM patients used CAM for its affordability and accessibility [27]. In Indonesia, CAM therapies are very easily accessible, since herb vendors and providers of CAM therapies, such as massage, cupping and acupuncture, do not need to be licensed.

A strong predictor of CAM usage in our study was the belief that CAM can help to control blood glucose. The effectiveness of various

Table 1
The demographic and clinical characteristics of users and nonusers and its relationship with CAM use (N = 628).

Variable	CAM users (n [%])	CAM nonusers (n [%])	P-value	Odds ratio (95% CI)
Gender				
Female	252 (73.9%)	231 (80.5%)	0.051	1.46 (0.99–2.12)
Male	89 (26.1%)	56 (19.5%)		
Age				
< 50 years	40 (11.7%)	30 (10.5%)	0.612	0.88 (0.53–1.45)
≥ 50 years	301 (88.3%)	257 (89.5%)		
Marital status				
Not married	8 (2.3%)	2 (0.7%)	0.259	NA
Married	271 (79.5%)	232 (80.8%)		
Widowed	62 (18.2%)	53 (18.5%)		
Religion				
Muslim	335 (98.2%)	281 (97.9%)	0.763	0.84 (0.37–2.63)
Other	6 (1.8%)	6 (2.1%)		
Education level				
No formal education	27 (7.9%)	12 (4.2%)	0.281	NA
Primary school	188 (55.1%)	181 (63.0 %)		
Junior high school	55 (16.1%)	43 (15.0%)		
Senior high school	45 (13.2%)	31 (10.8%)		
College	26 (7.6%)	20 (7.0%)		
Employment status				
Not employed/housewife	178 (52.2%)	180 (62.7%)	0.136	NA
Employed	130 (38.1%)	82 (28.6%)		
Pension	33 (9.7%)	25 (8.7%)		
Income				
Low income	288 (84.5%)	253 (88.2%)	0.699	NA
Middle income	50 (14.7%)	32 (11.1%)		
Higher income	3 (0.9%)	2 (0.7%)		
Duration of T2DM				
< 1 year	27 (7.9%)	30 (10.5 %%)	0.070	NA
1–5 years	190 (55.7%)	142 (49.5%)		
5–10 years	68 (19.9%)	78 (27.1%		
10–20 years	56 (16.4%)	37 (12.9%)		
Type of anti-diabetic medication				
No medication	21 (6.2%)	21 (7.3%)	0.736	NA
Oral	308 (90.3%)	254 (88.5%)		
Insulin	12 (3.5%)	12 (4.2%)		
Complications related to DM				
Yes	173 (50.7%)	146 (50.9%)	0.973	0.99 (0.72–1.36)
No	168 (49.3%)	141 (49.1%)		
Comorbidities				
Yes	121 (35.5%)	106 (36.9%)	0.706	1.06 (0.76–1.47)
No	220 (64.5%)	181 (63.1%)		

CAM: complementary and alternative medicine; CI: confidential interval; NA: not applicable; T2DM: type 2 diabetes mellitus.

CAM therapies and methods in reducing blood glucose and reducing complications in DM has been well studied [12–14,31–39]. However, many herbs and CAM interventions used by DM patients have yet to be investigated for their efficacy for reducing blood glucose. The use of herbal medicines that have not been shown to be effective can have harmful effects, they might increase blood glucose without patients realizing [40]. In our study, most CAM users combined CAM therapies with conventional medicine. It is important for patients to understand that herbal remedies are pharmacologically active and therefore may interact with conventional medicine. DM patients must therefore be educated about CAM usage and any effects that herbs may have on their blood glucose levels.

In our study, the belief that CAM interventions can maintain physical health was an important predictor of CAM usage in T2DM patients. This is consistent with a previous study that found that patients used CAM not only for the treatment of illness, but also for the purpose of promoting health [41]. CAM has been previously found effective in reducing fatigue and managing stress, lowering body weight, reducing anxiety and depression, and reducing joint stiffness [42–45].

Another predictor of CAM usage identified in our study was the belief that CAM interventions are safe. Most CAM users (82.7%) in this study believed the therapies to be safe. However, patients should aware that despite the benefits that CAM therapies may offer, herbal products can be toxic. A previous study showed that improper use of CAM can be harmful to the body [46]. Furthermore, improper use of CAM may even increase the severity of DM and can lead to complications [20]. Healthcare providers should therefore present their patients with evidence-based information regarding the safety issues, efficacy, and potential interactions of the most commonly used CAM interventions.

Surprisingly, in our study, demographic and clinical data were not predictors of CAM usage in Indonesia. This finding contrasts with previous studies in other countries that showed that demographic and clinical factors were predictors of CAM usage [8,19,24–26]. This difference might be due to cultural factors. A previous study showed that culture was associated with differences in CAM usage [47]. CAM usage may simply be firmly rooted in Indonesian culture, which would explain why it was unrelated to either socio-demographic or clinical factors. Study is needed to explore the potential role of culture in CAM usage in Indonesia.

The findings of this study add a new dimension to the literature. To our knowledge, this study was the first to show that the predictors of CAM use were not related to demographic or clinical characteristics. Our study also has important implications for clinical practice. Most participants in our study reported not having discussed their CAM usage with their healthcare providers and said they would not follow their healthcare provider's instructions if they were told not to use CAM therapies. This should be concerning to healthcare providers in Indonesia. Physicians and nurses should

Table 2
CAM users' and nonusers' knowledge, attitude and practice of CAM therapies.

Characteristics	CAM users (*n* [%])	CAM nonusers (*n* [%])	*P*-value	Odds ratio (95% CI)
Knowledge				
Have you heard of CAM?				
Yes	281 (82.4)	163 (56.8)	< 0.001	3.56 (2.48–5.13)
No	60 (17.6)	124 (43.2)		
Do you know that CAM products are safe?				
Yes	282 (82.7)	147 (51.2)	< 0.001	4.55 (3.16–6.55)
No	59 (17.3)	140 (48.8)		
Do you know that CAM products are effective?				
Yes	270 (79.2)	130 (79.2)	< 0.001	4.59 (3.23–6.51)
No	71 (20.8)	157 (20.8)		
Attitude				
If your physician instructed you not to use CAM, would you follow the advice?				
Yes	116 (34.0)	62 (21.6)	0.001	1.87 (1.30–2.68)
No	225 (66.0)	225 (78.4)		
Would you advise a family member with T2DM to use CAM therapies?				
Yes	198 (58.1)	80 (27.9)	< 0.001	3.58 (2.56–5.01)
No	143 (41.9)	207 (72.1)		
If you wanted to use CAM, would you discuss it with your physician?				
Yes	104 (30.5)	117 (40.8)	0.007	0.64 (0.46–0.89)
No	237 (69.5)	170 (59.2)		
If you want to use CAM, would you combine it with T2DM medications?				
Yes	203 (59.5)	125 (43.6)	< 0.001	1.92 (1.39–2.64)
No	138 (40.5)	162 (56.4)		
Reasons				
Waiting times are too long				
Yes	30 (8.8)	19 (6.6)	0.311	1.36 (0.75–2.47)
No	31 (91.2)	268 (93.4)		
Lack of trust in pharmaceutical drugs				
Yes	7 (2.1)	3 (1.0)	0.315	1.98 (0.5–7.74)
No	334 (97.9)	284 (99.0)		
Poor physician-patient communication				
Yes	2 (0.6)	2 (0.7)	0.860	0.84 (0.12–6.00)
No	339 (99.4)	285 (99.3)		
Your doctor has suggested CAM therapies				
Yes	17 (5.0)	14 (4.9)	0.950	1.02 (0.49–2.11)
No	324 (95.0)	273 (95.1)		
CAM therapies are easily available and inexpensive				
Yes	229 (67.2)	74 (25.8)	< 0.001	5.88 (4.15–8.33)
No	112 (32.8)	213 (74.2)		
CAM therapies have fewer side effects than pharmaceutical drugs				
Yes	149 (43.7)	54 (18.8)	< 0.001	3.35 (2.32–4.82)
No	192 (56.3)	233 (81.2)		
CAM therapies can help diabetes control				
Yes	158 (46.3)	58 (20.2)	< 0.001	3.40 (2.38–4.87)
No	183 (53.7)	229 (79.8)		
CAM therapies can maintain physical health				
Yes	214 (62.8)	101 (35.2)	< 0.001	3.10 (2.23–4.30)
No	127 (37.2)	186 (64.8)		

CAM: complementary and alternative medicine; CI: confidential interval; NA: not applicable; T2DM: type 2 diabetes mellitus.

build trust with their patients. Based on previous studies, healthcare providers should be sensitive to and respectful of their patients' decisions to use CAM; further, healthcare providers should provide evidence-based information about the efficacy and safety of CAM therapies [6,48]. Previous study has suggested that respecting for another's beliefs can create a safe environment for free speech, and this can improve relationships between healthcare providers and their patients [48]. Considering that most CAM therapies are recommended by family members in Indonesia, it is important that healthcare providers not only educate patients about CAM safety, but that they also include patients' family members. Our results show that CAM therapies should be incorporated into the curriculum of medical or nursing school, so that physicians and nurses understand their actions and interactions. Another implication that this study raised is the need to research the quality, efficacy and safety of the CAM therapies most commonly used by T2DM patients in Indonesia.

Our study also indicated a need for policy makers in Indonesia to create regulatory tools for the CAM market, in order to protect consumers and to provide guidelines about safe CAM usage. In addition, the government should create a campaign to improve patient awareness of the safety of CAM therapies, and to support research about the effectiveness, efficacy and side effects of the CAM therapies commonly used by T2DM patients in Indonesia.

This study had some limitations. First, since it was a cross-sectional study, we were unable to examine the change of KAP regarding CAM usage over time or to draw a causal relationship between variables. Second, the study was conducted in only 16 primary health centers in Banyumas Regency, and it may have excluded patients who did not visit such centers. Therefore, there may be some selection bias. Third, our use of convenience sampling might have created a sampling bias since there was no randomization. For these reasons, this study cannot be generalized to the entire population of Indonesia. Randomized studies, with a larger sample sizes are still needed to understand this problem. Fourth, while we found four predictors of CAM usage in T2DM patients in the country, other predictors may exist. Future qualitative and quantitative studies are needed to explore the factors that influence CAM usage in Indonesia. Despite its limitations, this is the first study in Indonesia to investigate the KAP and predictors

Table 3
Responses of CAM users.

Variable	Frequency and percentage (*n* [%])
Using CAM	
Yes	341 (54.3)
No	287 (45.7)
CAM practices used*	
Herbal products	341 (100.0)
Wet cupping	11 (3.22)
Nutritional supplements (vitamins and minerals)	120 (35.2)
Cautery	20 (5.9)
Spiritual healing	233 (68.3)
Honeybee products	133 (39.0)
Medical massage	144 (42.3)
Acupuncture	13 (3.8)
CAM was recommended by*	
Friends	255 (74.8)
Traditional healer	60 (17.6)
Pharmacist	172 (50.4)
Herbalist	80 (23.5)
Dietician	8 (2.3)
Physician	19 (5.6)
Family	312 (91.5)

CAM: complementary and alternative medicine.
* Multiple answers were given.

Table 4
The predictors of CAM usage among patients with T2DM.

Variable	*P*-value	Odds ratio (95% CI)
CAM therapies are safe	< 0.001	2.04 (1.40–2.95)
CAM therapies are easily available and inexpensive	< 0.001	4.59 (3.01–7.01)
CAM therapies can help diabetes control	0.009	1.75 (1.15–2.66)
CAM therapies can maintain physical health	0.010	1.68 (1.13–2.49)

CAM: complementary and alternative medicine; CI: confidential interval; T2DM: type 2 diabetes mellitus.

of CAM usage in T2DM patients. The findings of this study offer new and useful information for health policy makers in Indonesia to make guidelines and regulations regarding CAM usage. It is also of use to healthcare providers who are designing educational programs for their patients.

5. Conclusion

This study was the first to investigate the KAP of CAM usage in T2DM patients in Indonesia. The most common types of CAM therapies used by participants were herbs and spiritual healing. CAM therapies were most frequently recommended by family members. Our study revealed that CAM users had more knowledge and positive attitudes toward CAM therapies than nonusers. Among CAM users, most participants said they would not follow their healthcare provider's recommendations if instructed not to use CAM therapies and that they would not discuss their CAM usage with their healthcare providers. Our study also revealed that neither demographic nor clinical variables were predictors of CAM usage in T2DM patients in Indonesia. Four predictors of CAM usage in Indonesia are that CAM is accessible and affordable, that CAM therapies are deemed safe, that CAM can help with diabetes control, and that CAM can help maintain health. The results of this study imply that healthcare providers should build trusting relationships with their patients and that there is a need to educate patients and their family members about the efficacy and safety of CAM therapies. There is a clear need for further investigation into the quality, efficacy and safety of CAM therapies, and there is a need for local policy makers to regulate and create guidelines for CAM usage.

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Authors' contribution

YS contributed to the conception of the study, data collection, and data analysis. AS, AA and ES were responsible for data collection and participated in the data analysis. All authors participated in the scientific discussion regarding data interpretation and manuscript review and writing. All authors approved the final version of the manuscript.

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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Journal of Integrative Medicine (JIM) is a peer-reviewed journal sponsored by Shanghai Association of Integrative Medicine and Shanghai Changhai Hospital, China. It is a continuation of the Journal of Chinese Integrative Medicine (JCIM), which was established in 2003 and published in Chinese language (The phonetic romanization of the Chinese title used by MEDLINE/PubMed is Zhong Xi Yi Jie He Xue Bao). Since 2013, JIM has been published in English language.

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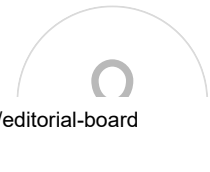

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Hui Chen, Wei Feng, Ye Lu, Yi Yang, ... Ying-di Gong
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Sutticha Ruangchuay, Qiang-qiang Wang, Liang-yi Wang, Jing Lin, ... Sasitorn Chusri
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FEEDBACK

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Scopus coverage years: from 2013 to Present

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ISSN: 2095-4964

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Journal of integrative medicine

COUNTRY	SUBJECT AREA AND CATEGORY	PUBLISHER	H-INDEX
Singapore Universities and research institutions in Singapore	Medicine Complementary and Alternative Medicine	Science Press (China)	35

PUBLICATION TYPE	ISSN	COVERAGE	INFORMATION
Journals	20954964	2013-2021	Homepage How to publish in this journal jcim@163.com

SCOPE

JIM is an interdisciplinary journal focusing on academic research and clinical studies in the field of integrative medicine. It aims to be a leading journal for studies in integrative medicine, and to promote communication and integration among traditional medicinal systems, complementary and alternative medicine (CAM), and conventional western medicine. The editorial board is committed to publishing high-quality papers on integrative medicine and creating an open forum in which the international scholarly community can exchange views, share research and clinical experience, discuss integrative medicine education, and confer about issues and problems in our various disciplines and in integrative medicine as a whole. The journal's international scope ensures that research and progress from all regions of the world are widely covered. Topics covered include all aspects of integrative medicine, such as acupuncture and moxibustion, traditional Chinese medicine, Ayurvedic medicine, herbal medicine, homeopathy, nutrition, chiropractic, mind-body medicine, Taichi, Qigong, meditation, and any other modalities of CAM, as well as their integration with the conventional medicine.

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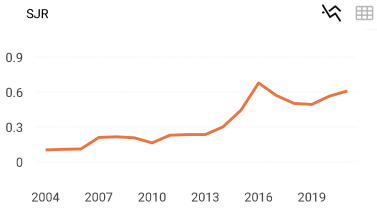

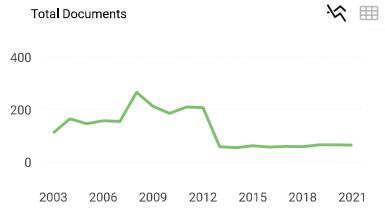

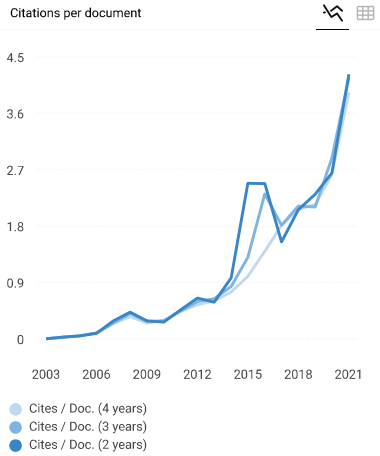

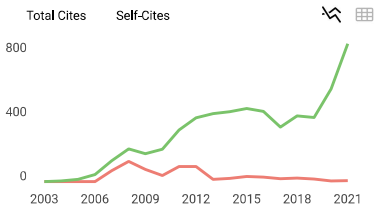

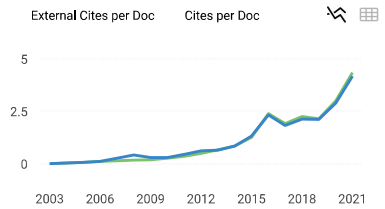

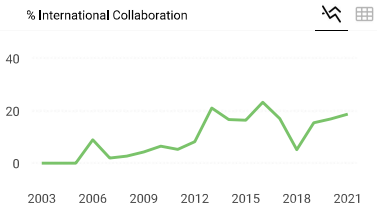

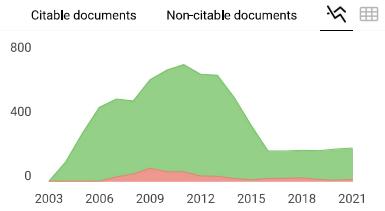

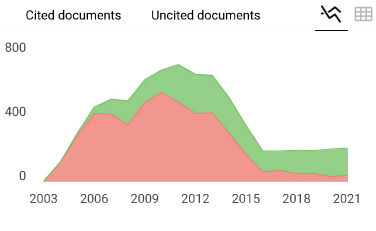

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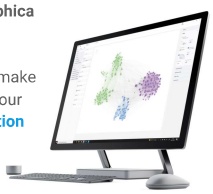

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