Research Article

Awareness, Perception, Attitude, and Knowledge Regarding Complementary and Alternative Medicines (CAMs) Among the Pharmacy and Medical Students of a Public University in Saudi Arabia

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Abstract

Introduction: The use of natural products, that is, herbs for clinical and domestic purposes, is quite common in Saudi Arabia. Studies have reported an increasing use of complementary and alternative medicines (CAMs). This study aims to investigate the perception, attitude, and knowledge of the students regarding CAMs and their use. **Materials and Methods:** A quantitative, cross-sectional study targeting the students of the pharmacy and medical colleges at the University of Dammam, Saudi Arabia was conducted for a 6-month duration. It employed a survey questionnaire termed as CAMs inventory. **Results:** The majority of the respondents were females (N = 180, 60.8%), and a major segment (N = 170, 57.4%) belonged to the age group between 21 and 23 years. Nearly half of the students (N = 121, 40.9%) strongly agreed on the need for integration of CAMs-related courses in medical and allied health education, and a similar proportion (N = 129, 43.6%) of the target population acknowledged using CAMs, based on family recommendations (N = 134, 45.3%). Half of the students (N = 142, 48%) had no knowledge about CAMs. Some of the CAMs were more prevalent in males and vice versa (P value <0.05). **Conclusion:** A positive perception and attitude toward CAMs was observed. It is influenced by their traditional use and partly by the recent induction of CAMs-related education in pharmacy. The majority of the students agreed on integrating CAMs-related courses in their curriculum. It was also observed that the knowledge regarding the subject was inadequate. Lastly, gender has the potential to influence the use of particular CAMs.

Keywords: Attitude, awareness, CAMs, complementary and alternative medicines, knowledge, medical students, perception, pharmacy students, Saudi Arabia

Introduction

Complementary and alternative medicines (CAMs) may be defined as any alternative treatment other than conventional system of treatment. This includes the use of herbal and natural products, traditional medicines, and treatment strategies such as the use of plants and herbs, aromatherapy, acupuncture, and chiropractic. Studies report that in the recent years, there has been an increase in the use of the CAMs worldwide.[1] In USA, around 42% of the population use CAMs for their medical problems. This figure was even higher in the European countries and Australia, because 50% of the population use CAMs.[2]

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In Saudi Arabia, CAMs use has been prevailing since a long time. The use of traditional Arabic and Islamic plants was very common in this region and has an association with the religious and cultural background.[3] This has drawn its roots from *Tibbi Nabawi* or Prophetic medicine, which is basically

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the teachings of Prophet Muhammad (P.B.U.H.) regarding natural products and their use. Hence, this practice (*sunnah*) is predominantly followed in the region.[4]

In the context of Saudi Arabia, this use of CAMs present an increasing demand and need to include courses related to the knowledge of CAMs in the curriculum of health-related programs that may differ among countries.[5] The present study derives its rationality from the fact that CAMs are now widely used in the Arab world, but there is very limited information on the topic.[6]

In Saudi Arabia, there is a tendency to use the Arabic and Islamic plants and herbs as home-based remedies for different ailments or simply as prophylactic treatment. Therefore, we would like to know whether the modern education in medical and health sciences in Saudi Arabia has fortified this concept of using CAMs among the students of medical and health sciences or not. The study is aimed at investigating the level of knowledge, personal experience, and perceptions toward CAMs among the medical and health sciences students (future doctors) at the University of Dammam.

Materials and Methods

A cross-sectional study was conducted among the students of the pharmacy and medical colleges at the University of Dammam, Saudi Arabia for 6 months with especially formulated survey questionnaire known as CAMs inventory.

Purpose and rationality

The study derives its rationality from the fact that CAMs are now actively used in the modern world. In addition, in the region of Saudi Arabia, there is a tendency to use the Arabic and Islamic plants and herbs as home-based remedies for different ailments. There is a need for knowing whether the modern education in medical and health sciences has fortified this concept of using CAMs among the minds of the students or not.

Study duration and venue

The duration of the study was 6 months. The study took place in the pharmacy and medical colleges affiliated with the University of Dammam, Saudi Arabia.

Target population

The target population of the study was the students of the pharmacy and medical colleges affiliated with the University of Dammam, Saudi Arabia who were studying in the 2nd to the 6th year of professional education.

Inclusion/exclusion criteria

The study included the students currently enrolled in the pharmacy and medical colleges affiliated with the University of Dammam, Saudi Arabia. The students from other faculties as well as the students who were dropped from the program were excluded. All incomplete and incorrectly filled responses along with nonconsenting participants were excluded from the study.

Sampling procedure

The study employed convenient sampling to gather as much responses as possible, and the data of the students were collected in their free (off peak) time.

Estimated sample size

An estimated sample size was calculated by keeping the response rate to 50%, alpha error (α) at 5%, and confidence level at 95%, and the size was found to be 369.

Research instrument

The research instrument consisted of survey questionnaire with 38 multiple choice type questions. The questionnaire was divided into four sections; the first part dealt with the demographic information of the respondents, the second section was concerned with the personal experiences of the respondents with CAMs, the third section dealt with the attitudes and perception of the students toward CAMs, and the fourth section tested the student knowledge about CAMs. The question related to the attitudes and perceptions employed Likert Scale format options for answer.

Validation procedure

The questionnaire was validated by four academic professionals who were pharmacists with expertise in herbs (CAMs) and specialization in Pharmacy Practice. The first phase of the validation consisted of fortification of the questions with Arabic names of the CAMs to promote better understanding of the questions for the respondents. The second phase involved addition of more questions regarding the knowledge about CAMs used at homes. Finally, the questionnaire was subjected to thorough editing and was checked for spelling and grammatical errors.

Sampling adequacy and reliability

The sampling adequacy of CAMs inventory was measured by Kaiser–Meyer–Olkin measure of sampling adequacy, which reported the value of 0.397 and Bartlett's test of sphericity, which reported significant P value of <0.0001. The reliability analysis reported a Cronbach's alpha value of 0.82, that is, good reliability for $N = 63$ items.

Piloting of the questionnaire

The questionnaire was piloted on four pharmacy students, and it was validated. It took 21 min to fill in the responses correctly. The students did not find it difficult to comprehend. After piloting, it was found to be validated and was approved for data collection.

Data coding and analysis

The data obtained from the students were coded into categorical variables. The demographic data were expressed as numbers (N) and percentages (%). The data about the knowledge and personal experiences were expressed as numbers and percentages. The data relating to the attitudes and perceptions regarding CAMs were expressed as mean (X) and standard deviation. Regarding inferential statistics, the data were subjected to Chi-square test for independence and test

for association. Cross-tabulation was also employed to check for associations between demographics of the respondents and their knowledge, attitudes, and perceptions regarding CAMs. Correlation using Spearman's rho (R) was applied to find the correlation between the variables. Statistical Package for the Social Sciences version 22 software (SPSS Inc., IBM Corporation, 1 New Orchard Road Armonk, New York 10504-1722, United States. 914-499-1900) was employed to analyze the data. Statistical significance was set at P values <0.05.

Participant consent

The respondents were handed a written informed consent form, and upon consenting, they were given CAMs inventory. The participation of the respondents was anonymous and voluntary. No incentive was given to the respondents upon filling the questionnaire.

Ethical approval

The study was submitted for ethical approval and was granted exemption from review.

Results

Demographic information

The majority of the respondents were females (N = 180, 60.8%), and a significant segment (N = 170, 57.4%) belonged to the age group between 21 and 23 years. The survey incorporated the students from the College of Clinical Pharmacy (N = 170, 57.4%) and the College of Medicine (N = 126, 42.6%). The breakdown of data based on years of study revealed an equal proportion of the students involved in the study, with the students of the 2nd professional year making up a quarter of the target segment (N = 75, 25.3%) and the students of the 4th year forming a 10th proportion (N = 32, 10.8%). Nearly a third proportion (N = 95, 32.1%) reported family, friends, and ancestral background as their source of information regarding CAMs. The data are represented in Table 1.

Table 1: Demographic characteristics of respondents

Variable	Sample (N)	Percentage	P
Gender			<0.01
Male	116	39.2	
Female	180	60.8	
Total	296	100.0	
Age groups			<0.01
18-20	84	28.4	
21-23	170	57.4	
24-26	42	14.2	
Total	296	100.0	
College of study			<0.05
Medicine	126	42.6	
Clinical Pharmacy	170	57.4	
Total	296	100.0	
Year of Study			<0.01
2nd year	75	25.3	
3rd year	65	22.0	
4th year	32	10.8	
5th year	62	20.9	
6th year	62	20.9	
Total	296	100.0	
Source of information regarding CAMs			<0.01
Formal education/courses	39	13.2	
Media/TV	6	2.0	
Newspapers	1	0.3	
Internet	28	9.5	
Family/Ancestors/Friends	95	32.1	
Others	3	1.0	
More than one source	124	41.9	
Total	296	100.0	

Use of CAMs

The data regarding the use of natural products as CAMs revealed that the majority of the students highlighted the use of cascara (N = 199, 67.2%) personally and in the family (N = 221, 74.7%) as well. Similar results were obtained for cardamom, ginger, anise, garlic, and nigella; however, the use of aloe, clove, fennel, fenugreek, castor oil, and chamomile was prevalent in the family of the students, whereas declined by the students in their personal use. The use of mustard was neither prevalent in the family (N = 97, 32.8%) nor among the students (N = 68, 23%). A detailed summary is tabulated in Table 2.

Perceptions toward CAMs use

The students were also evaluated regarding their perception toward CAMs use. Nearly half of the students (N = 121, 40.9%) strongly agreed on the need for integration of CAMs-related courses in the medical and allied health education. A similar number of students (N = 120, 40.5%) strongly agreed to the idea of consulting healthcare professionals, that is, practitioners and pharmacists prior to using CAMs, and the students believed that pharmacists should counsel patients on its usage (N = 115, 38.9%). Besides, a major segment believed the lack of evidence-based studies as a barrier toward proper CAMs usage (N = 114, 38.5%) as well as a majority (N = 130, 43.9%) remained neutral in responding to legalities being a barrier to CAMs usage. However, a third proportion (N = 102, 34.5%) were not confident of CAMs being appropriate for use in disease state management, and they remained neutral to the notion of CAMs use being a health risk for the public (N = 108, 36.5%) followed by similar numbers (N = 100, 33.8%) regarding the perception that CAMs have fewer side effects. The summary of the perceptions is presented in Table 5.

Attitude toward CAMs and their use

The students' attitudes toward CAMs use were also investigated. In response to the question of personal use of CAMs for one's own health, nearly half (N = 129, 43.6%) of the target segment acknowledged using CAMs, whereas the majority of the students (N = 134, 45.3%) agreed that their usage of CAMs was based on family recommendation. However, similar

Table 2: Summary of use of CAMs by respondents and their family/relatives

Self use	Sample (*N*)	Percentage	*P*	Family use	Sample (*N*)	Percentage	*P*
Aloe			<0.01				<0.01
Yes	82	27.7		Yes	120	40.5	
No	214	72.3		No	176	59.5	
Total	296	100.0		Total	296	100.0	
Clove			<0.01				>0.05
Yes	119	40.2		Yes	161	54.4	
No	177	59.8		No	135	45.6	
Total	296	100.0		Total	296	100.0	
Cascara			<0.01				<0.01
Yes	199	67.2		Yes	221	74.7	
No	97	32.8		No	75	25.3	
Total	296	100.0		Total	296	100.0	
Cardamom			>0.05				<0.01
Yes	160	54.1		Yes	179	60.5	
No	136	45.9		No	117	39.5	
Total	296	100.0		Total	296	100.0	
Fennel			<0.01				<0.01
Yes	67	22.6		Yes	106	35.8	
No	229	77.4		No	190	64.2	
Total	296	100.0		Total	296	100.0	
Ginger			<0.01				<0.01
Yes	228	77.0		Yes	254	85.8	
No	68	23.0		No	42	14.2	
Total	296	100.0		Total	296	100.0	
Anise			>0.05				<0.01
Yes	157	53.0		Yes	234	79.1	
No	139	47.0		No	62	20.9	
Total	296	100.0		Total	296	100.0	
Fenugreek			<0.01				<0.01
Yes	106	35.8		Yes	217	73.3	
No	190	64.2		No	79	26.7	
Total	296	100.0		Total	296	100.0	
Mustard			<0.01				<0.01
Yes	68	23.0		Yes	97	32.8	
No	228	77.0		No	199	67.2	
Total	296	100.0		Total	296	100.0	
Castor oil			<0.01				<0.01
Yes	110	37.2		Yes	188	63.5	
No	186	62.8		No	108	36.5	
Total	296	100.0		Total	296	100.0	
Garlic			<0.05				<0.01
Yes	170	57.4		Yes	227	76.7	
No	126	42.6		No	69	23.3	
Total	296	100.0		Total	296	100.0	
Chamomile			<0.01				<0.05
Yes	79	26.7		Yes	128	43.2	
No	217	73.3		No	168	56.8	
Total	296	100.0		Total	296	100.0	
Nigella			<0.01				<0.01
Yes	191	64.5		Yes	229	77.4	
No	105	35.5		No	67	22.6	
Total	296	100.0		Total	296	100.0	

figures (N = 110, 37.2%) for being neutral were obtained when asked about its use based on the health practitioners' recommendation. When they were asked if they used CAMs therapy as they were more effective when compared to

Table 3: Correlation between personal uses of different CAMs

	Correlations (Spearman's rho)												
Personal use (*N*=296)	**Aloe**	**Clove**	**Cascara**	**Cardamom**	**Fennel**	**Ginger**	**Anise**	**Fenugreek**	**Mustard**	**Castor oil**	**Garlic**	**Chamomile**	**Nigella**
Aloe													
Coefficient	1.000	0.278**	0.223**	0.268**	0.297**	0.069	0.174**	0.152**	0.290**	0.305**	0.212**	0.156**	0.254**
Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.237	0.003	0.009	0.000	0.000	0.000	0.007	0.000
Clove													
Coefficient	0.278**	1.000	0.411**	0.452**	0.462**	0.268**	0.316**	0.207**	0.306**	0.182**	0.371**	0.269**	0.378**
Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
Cascara													
Coefficient	0.223**	0.411**	1.000	0.512**	0.326**	0.372**	0.396**	0.326**	0.279**	0.269**	0.374**	0.226**	0.385**
Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cardamom													
Coefficient	0.268**	0.452**	0.512**	1.000	0.337**	0.431**	0.341**	0.293**	0.358**	0.316**	0.618**	0.219**	0.492**
Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fennel													
Coefficient	0.297**	0.462**	0.326**	0.337**	1.000	0.180**	0.282**	0.286**	0.261**	0.219**	0.319**	0.239**	0.367**
Sig. (2-tailed)	0.000	0.000	0.000	0.000	.	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ginger													
Coefficient	0.069	0.268**	0.372**	0.431**	0.180**	1.000	0.419**	0.291**	0.184**	0.204**	0.358**	0.184**	0.367**
Sig. (2-tailed)	0.237	0.000	0.000	0.000	0.002		0.000	0.000	0.002	0.000	0.000	0.001	0.000
Anise													
Coefficient	0.174**	0.316**	0.396**	0.341**	0.282**	0.419**	1.000	0.378**	0.305**	0.289**	0.326**	0.399**	0.321**
Sig. (2-tailed)	0.003	0.000	0.000	0.000	0.000	0.000	.	0.000	0.000	0.000	0.000	0.000	0.000
Fenugreek													
Coefficient	0.152**	0.207**	0.326**	0.293**	0.286**	0.291**	0.378**	1.000	0.212**	0.286**	0.301**	0.171**	0.348**
Sig. (2-tailed)	0.009	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.003	0.000
Mustard													
Coefficient	0.290**	0.306**	0.279**	0.358**	0.261**	0.184**	0.305**	0.212**	1.000	0.278**	0.356**	0.324**	0.287**
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000		0.000	0.000	0.000	0.000
Castor oil													
Coefficient	0.305**	0.182**	0.269**	0.316**	0.219**	0.204**	0.289**	0.286**	0.278**	1.000	0.224**	0.279**	0.293**
Sig. (2-tailed)	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
Garlic													
Coefficient	0.212**	0.371**	0.374**	0.618**	0.319**	0.358**	0.326**	0.301**	0.356**	0.224**	1.000	0.149*	0.476**
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.	0.010	0.000
Chamomile													
Coefficient	0.156**	0.269**	0.226**	0.219**	0.239**	0.184**	0.399**	0.171**	0.324**	0.279**	0.149*	1.000	0.192**
Sig. (2-tailed)	0.007	0.000	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.010		0.001
Nigella													
Coefficient	0.254**	0.378**	0.385**	0.492**	0.367**	0.367**	0.321**	0.348**	0.287**	0.293**	0.476**	0.192**	1.000
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	

The personal use of different CAMs was analyzed for any correlation using Spearman's method. The Spearman's rho (R) value, that is, correlation coefficient, was assessed as a measure of correlation between two variables. A significant *P* value (<0.05) indicated statistical association. The number of total cases was 296. A positive correlation was obtained for all the proscribed CAMs except ginger (>0.05). Apart from ginger, all correlations were statistically significant (<0.05). Higher correlation coefficient values were reported for the use of cardamom with; clove (0.452), cascara (0.512), garlic (0.618), and nigella (0.492). The use of cardamom appeared most correlated with high correlation coefficient values. The reported correlation coefficient value is 0.411 for the use of clove and cascara, 0.419 for anise and ginger, and 0.476 for nigella and garlic. The details are tabulated in Table 3 as highlighted in black

conventional medicines, a fourth proportion (*N* = 118, 39.9%) remained neutral. The details of the respondents' attitude toward CAMs use are presented in Table 6. The correlation of demographics and attitudes are given in Table 7.

Knowledge regarding CAMs and its use

The knowledge of the respondents regarding CAMs use was assessed by 10 points scoring item. The students were asked five questions graded with points, that is, 2 points and 0 points for correct and wrong answers, respectively. On the basis of the aforementioned grading system, the results observed were: the students with excellent knowledge (*N* = 0, 0%), no knowledge (*N* = 142, 48%), and low knowledge (*N* = 129, 43.6%). The results are tabulated in Table 8.

Table 4: Correlation between family use and personal use of CAMs

		Correlations (Spearman's rho) (*N*=296)												
Family use of	**Personal use of**	**Aloe**	**Clove**	**Cascara**	**Cardamom**	**Fennel**	**Ginger**	**Anise**	**Fenugreek**	**Mustard**	**Castor oil**	**Garlic**	**Chamomile**	**Nigella**
Aloe	Coefficient	0.534*	0.376*	0.298*	0.292*	0.277*	0.107	0.170*	0.230*	0.269*	0.234*	0.266*	0.217*	0.339*
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.065	0.003	0.000	0.000	0.000	0.000	0.000	0.000
Clove	Coefficient	0.264*	0.626*	0.401*	0.449*	0.349*	0.290*	0.253*	0.245*	0.258*	0.269*	0.323*	0.276*	0.384*
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cascara	Coefficient	0.135*	0.319*	0.553*	0.382*	0.241*	0.236*	0.323*	0.208*	0.207*	0.223*	0.284*	0.193*	0.347*
	Sig. (2-tailed)	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Cardamom	Coefficient	0.223*	0.381*	0.407*	0.697*	0.239*	0.314*	0.236*	0.171*	0.277*	0.264*	0.492*	0.175*	0.397*
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.002	0.000
Fennel	Coefficient	0.152*	0.422*	0.311*	0.335*	0.589*	0.190*	0.265*	0.295*	0.229*	0.228*	0.315*	0.266*	0.318*
	Sig. (2-tailed)	0.009	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ginger	Coefficient	0.057	0.195*	0.191*	0.227*	0.151*	0.284*	0.180*	0.102	0.107	0.172*	0.218*	0.158*	0.245*
	Sig. (2-tailed)	0.328	0.001	0.001	0.000	0.009	0.000	0.002	0.080	0.066	0.003	0.000	0.007	0.000
Anise	Coefficient	0.096	0.185*	0.313*	0.258*	0.179*	0.212*	0.381*	0.194*	0.143*	0.224*	0.195*	0.254*	0.208*
	Sig. (2-tailed)	0.099	0.001	0.000	0.000	0.002	0.000	0.000	0.001	0.014	0.000	0.001	0.000	0.000
Fenugreek	Coefficient	0.066	0.199*	0.213*	0.256*	0.144*	0.288*	0.228*	0.244*	0.130*	0.180*	0.268*	0.105	0.271*
	Sig. (2-tailed)	0.255	0.001	0.000	0.000	0.013	0.000	0.000	0.000	0.026	0.002	0.000	0.071	0.000
Mustard	Coefficient	0.243*	0.323*	0.334*	0.441*	0.242*	0.227*	0.224*	0.259*	0.543*	0.253*	0.383*	0.311*	0.352*
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Castor oil	Coefficient	0.171*	0.192*	0.174*	0.231*	0.142*	0.153*	0.159*	0.171*	0.230*	0.351*	0.199*	0.267*	0.171*
	Sig. (2-tailed)	0.003	0.001	0.003	0.000	0.015	0.008	0.006	0.003	0.000	0.000	0.001	0.000	0.003
Garlic	Coefficient	0.181*	0.305*	0.296*	0.390*	0.222*	0.212*	0.218*	0.145*	0.187*	0.126*	0.495*	0.116*	0.309*
	Sig. (2-tailed)	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.001	0.030	0.000	0.046	0.000
Chamomile	Coefficient	0.176*	0.230*	0.203*	0.189*	0.212*	0.185*	0.220*	0.159*	0.269*	0.260*	0.145*	0.506*	0.220*
	Sig. (2-tailed)	0.002	0.000	0.000	0.001	0.000	0.001	0.000	0.006	0.000	0.000	0.013	0.000	0.000
Nigella	Coefficient	0.172*	0.295*	0.259*	0.344*	0.254*	0.280*	0.203*	0.168*	0.199*	0.249*	0.302*	0.162*	0.510*
	Sig. (2-tailed)	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.001	0.000	0.000	0.005	0.000

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). The correlation between the use of aloe in the family and for personal use yielded high coefficient value (0.534) with statistical significance (i.e., $P<0.05$). The correlation coefficient (R) value was observed for the use of clove in the family with its personal use (0.626), cascara (0.401), and cardamom (0.449). The family use of cardamom reported (R) values; with personal use of cascara (0.407), cardamom (0.697), and garlic (0.492). The use of cascara in the family with its personal use reported coefficient (R) value of 0.553. The family use of fennel reported (R) values with personal use of clove (0.422) and fennel (0.589). The correlation coefficient values for the use of mustard in the reported (R) values with its personal use (0.543) and cardamom (0.441). The value for the use of garlic in the family with its personal use was reported at (0.495), and similar figures were reported for chamomile (0.506) and nigella (0.510). The correlations for family use of ginger, anise, and fenugreek with personal use of aloe were non-significant (>0.05). Similarly, the use of ginger in the family correlated with personal use of fenugreek and mustard was non-significant as well (>0.05). The details of the correlation between the family and personal use of CAMs are tabulated in Table 4, as highlighted in black. The family and personal use of CAMs is presented in columns and rows, respectively.

Associations of gender with different types of CAMs use

The use of CAMs for personal and family use was cross-tabulated with gender, which revealed significant findings. The use of aloe and clove was more prevalent in the family, particularly in the male respondents (N = 50 aloe, N = 68 clove for observed) as compared to the expected count (i.e., N = 47 aloe, N = 63.1 clove); however, it was not significant in both instances (i.e., P values >0.05). Furthermore, the use of cardamom and fennel was prevalent in the family with male observed count (N = 76 cardamom, N = 44 fennel) more than expected (i.e., N = 70.1 cardamom, N = 41.5 fennel) but was not observed to be statistically significant with P values >0.05; however, the personal use of cardamom by the students was significant (P value <0.01). The use of cardamom by the male gender was higher than the expected count (N = 78 observed, N = 62.7 expected). The use of cascara was prevalent and significant for family (<0.01) and personal use (<0.05). The tendency toward the use of cascara by females was found more than expected count in both instances (i.e., N = 128 observed, N = 121 expected) and use in the family (i.e., N = 148 observed, N = 134 expected). The use of ginger was prevalent in both personal and family; however, a statistical significance was observed in personal use (<0.01) in males with observed count more than expected (i.e., N = 100 observed, N = 89.4 expected) for personal use. Family use of anise was significant (i.e., P values < 0.05) and females observed in more numbers, (N = 154 observed, N = 142.3 expected). The personal use of garlic and fenugreek was also statistically significant, that is, P values < 0.01 and males were observed using it to in more numbers than expected (i.e., N = 79 observed, N = 66.6 expected) for garlic and (N = 53 observed, N = 41.5 expected) for fenugreek. The use of chamomile was significant in the

Table 5: Perception of respondents towards CAMs use

Perceptions	Number (*N*)	Percentage	*P*
Integration of CAMs courses in medical and allied health education is important			<0.01
Strongly agree	121	40.9	
Agree	108	36.5	
Neutral	53	17.9	
Disagree	9	3.0	
Strongly disagree	5	1.7	
Total	296	100.0	
CAMs are appropriate to use in diseases management			<0.01
Strongly agree	25	8.4	
Agree	45	15.2	
Neutral	81	27.4	
Disagree	102	34.5	
Strongly disagree	43	14.5	
Total	296	100.0	
CAMs use is a risk to public health			<0.01
Strongly agree	20	6.8	
Agree	79	26.7	
Neutral	108	36.5	
Disagree	66	22.3	
Strongly disagree	23	7.8	
Total	296	100.0	
CAMs have fewer side effects			<0.01
Strongly agree	28	9.5	
Agree	84	28.4	
Neutral	100	33.8	
Disagree	72	24.3	
Strongly disagree	12	4.1	
Total	296	100.0	
Consulting healthcare professionals before CAMs use is important			<0.01
Strongly agree	120	40.5	
Agree	102	34.5	
Neutral	60	20.3	
Disagree	13	4.4	
Strongly disagree	1	0.3	
Total	296	100.0	
Lack of scientific evidence is a barrier toward CAMs use			<0.01
Strongly agree	114	38.5	
Agree	113	38.2	
Neutral	54	18.2	
Disagree	14	4.7	
Strongly disagree	1	0.3	
Total	296	100.0	
Legal issues are a barrier toward CAMs use			<0.01
Strongly agree	21	7.1	
Agree	93	31.4	
Neutral	130	43.9	
Disagree	47	15.9	

Contd...

Table 5: Contd...

Perceptions	Number (*N*)	Percentage	*P*
Strongly disagree	5	1.7	
Total	296	100.0	
Pharmacists should counsel patients on CAMs use			<0.01
Strongly agree	104	35.1	
Agree	115	38.9	
Neutral	47	15.9	
Disagree	27	9.1	
Strongly disagree	3	1.0	
Total	296	100.0	
CAMs courses should be taught to all medical students			<0.01
Strongly agree	78	26.4	
Agree	121	40.9	
Neutral	66	22.3	
Disagree	23	7.8	
Strongly disagree	8	2.7	
Total	296	100.0	

Table 6: Attitude of respondents towards CAMs use

Attitude	Sample (*N*)	Percentage	*P*
I use CAMs therapy for my health			<0.01
Strongly agree	29	9.8	
Agree	129	43.6	
Neutral	101	34.1	
Disagree	31	10.5	
Strongly disagree	6	2.0	
Total	296	100.0	
I use CAMs therapy as they are more effective than conventional therapy			<0.01
Strongly agree	7	2.4	
Agree	22	7.4	
Neutral	118	39.9	
Disagree	117	39.5	
Strongly disagree	32	10.8	
Total	296	100.0	
I use CAMs on family recommendation			<0.01
Strongly agree	21	7.1	
Agree	134	45.3	
Neutral	90	30.4	
Disagree	39	13.2	
Strongly disagree	12	4.1	
Total	296	100.0	
I use CAMs on doctor recommendation			<0.01
Strongly agree	10	3.4	
Agree	36	12.2	
Neutral	110	37.2	
Disagree	104	35.1	
Strongly disagree	36	12.2	
Total	296	100.0	

Table 7: Correlation of demographics and attitudes

Correlations (Spearman's rho) (*N*=296)								
	Gender	College	Study Year	Age	I use CAMs therapy			
					For my health	They are more effective	Family's recommendation	Doctor's advice
Gender								
Coefficient	1.000	−0.159**	0.153**	0.141*	0.025	0.109	−0.017	0.071
Sig. (2-tailed)		0.006	0.009	0.015	0.669	0.062	0.777	0.225
College								
Coefficient	−0.159**	1.000	−0.844**	−0.587**	−0.256**	−0.225**	−0.147*	−0.051
Sig. (2-tailed)	0.006		0.000	0.000	0.000	0.000	0.012	0.385
Study Year								
Coefficient	0.153**	−0.844**	1.000	0.807**	0.216**	0.230**	0.174**	0.053
Sig. (2-tailed)	0.009	0.000		0.000	0.000	0.000	0.003	0.363
Age								
Coefficient	0.141*	−0.587**	0.807**	1.000	0.129*	0.159**	0.073	-0.021
Sig. (2-tailed)	0.015	0.000	0.000	.	0.026	0.006	0.208	0.718
I use CAMs therapy for my health								
Coefficient	0.025	−0.256**	0.216**	0.129*	1.000	0.361**	0.350**	0.129*
Sig. (2-tailed)	0.669	0.000	0.000	0.026		0.000	0.000	0.026
I use CAMs therapy as they are more effective								
Coefficient	0.109	−0.225**	0.230**	0.159**	0.361**	1.000	0.242**	0.301**
Sig. (2-tailed)	0.062	0.000	0.000	0.006	0.000		0.000	0.000
I use CAMs based on family recommendation								
Coefficient	−0.017	−0.147*	0.174**	0.073	0.350**	0.242**	1.000	0.137*
Sig. (2-tailed)	0.777	0.012	0.003	0.208	0.000	0.000		0.018
I use CAMs based on doctor recommendation								
Coefficient	0.071	−0.051	0.053	-0.021	0.129*	0.301**	0.137*	1.000
Sig. (2-tailed)	0.225	0.385	0.363	0.718	0.026	0.000	0.018	

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed)

Table 8: Knowledge of respondents regarding CAMs use

Score interpretation	Sample (*N*)	Percentage	*P*
No knowledge (0 Score)	142	48	<0.05
Low knowledge (2-4 Score)	129	43.6	
Adequate knowledge (6-8 Score)	25	8.4	
Excellent knowledge (Above 8 Score)	0	0	
Total	296	100.0	

family, that is, *P* values <0.05 and females using it were observed (*N* = 90) more than expected (*N* = 77.8). The use of nigella was significant in case of personal use (<0.05), and males were observed to use it more than the expected count (*N* = 83 observed, *N* = 74.9 expected). The summary of cross-tabulated data is presented in Table 9.

In addition to this, the affiliation of the students was also tabulated with their personal use of CAMs. The use of aloe, anise, mustard, and chamomile was not statistically significant (>0.05), because they were observed to be used by the students of both colleges. However, the use of clove appeared significant (<0.05), with the students of the College of Clinical Pharmacy using it more than expected (i.e., *N* = 93 observed, *N* = 77 expected). In the same way, the use of cascara was more prevalent among the students of the pharmacy colleges, because 138 students appeared using it out of 114.3 expected, with statistical significance of <0.01. Similarly, significant results (<0.01) were obtained for cardamom, fennel, ginger, fenugreek, castor oil, garlic, and nigella, because the students of the College of Clinical Pharmacy were observed to be using it in more numbers than expected. The results of cross-tabulation between the student affiliation and the use of CAMs are presented in Table 10.

Furthermore, the year of study of the students was also cross-tabulated with their use of CAMs. The results revealed no significant *P* values (>0.05) for aloe, anise, mustard, and chamomile. However, the use of clove and fennel appeared significant (<0.01), with the students of the 3rd and 4th professional year using it more than expected. The use of cascara, cardamom, and ginger was also significant (<0.01), and the students of the 2nd, 3rd, and 4th professional year reported using it in more numbers than expected. Similar results were

Table 9: Use of CAMs personally or in the family/relatives

Cross tabulation	Gender (*N*=296)		*P*	Cross tabulation	Gender		*P*
	Male	Female			Male	Female	
Personal use of	Observed (Expected)	Observed (Expected)		Family/relative use of	Observed (Expected)	Observed (Expected)	
Aloe				Aloe			
Yes	29 (32.1)	53 (49.9)	>0.05	Yes	50 (47)	70 (73)	>0.05
No	87 (83.9)	127 (130.1)		No	66 (69)	110 (107)	
Clove				Clove			
Yes	54 (46.6)	65 (72.4)	>0.05	Yes	68 (63.1)	93 (97.9)	>0.05
No	62 (69.4)	115 (107.6)		No	48 (52.9)	87 (82.1)	
Cascara				Cascara			
Yes	70 (78)	128 (121)	<0.05	Yes	73 (86.6)	148 (134)	<0.01
No	46 (38)	51 (59)		No	43 (29.4)	32 (45.6)	
Cardamom				Cardamom			
Yes	78 (62.7)	82 (97.3)	<0.01	Yes	76 (70.1)	103 (108.9)	>0.05
No	38 (53.3)	98 (82.7)		No	40 (45.9)	77 (71.1)	
Fennel				Fennel			
Yes	30 (26.3)	37 (40)	>0.05	Yes	44 (41.5)	62 (64.5)	>0.05
No	86 (89.7)	143 (139.3)		No	72 (74.5)	118 (115.5)	
Ginger				Ginger			
Yes	100 (89.4)	128 (138.6)	<0.01	Yes	100 (95.5)	154 (154.5)	>0.05
No	16 (26.6)	52 (41.4)		No	16 (16.5)	26 (25.5)	
Anise				Anise			
Yes	63 (61.5)	94 (95.5)	>0.05	Yes	80 (91.7)	154 (142.3)	<0.01
No	53 (54.5)	86 (84.5)		No	36 (24.3)	26 (37.7)	
Fenugreek				Fenugreek			
Yes	53 (41.5)	53 (64.5)	<0.01	Yes	82 (85)	135 (132)	>0.05
No	63 (74.5)	127 (115.5)		No	34 (31)	45 (48)	
Mustard				Mustard			
Yes	30 (26.6)	38 (41.4)	>0.05	Yes	40 (38)	57 (59)	>0.05
No	86 (89.4)	142 (138.6)		No	76 (78)	123 (121)	
Castor oil				Castor oil			
Yes	37 (43.1)	73 (66.9)	>0.05	Yes	69 (73.7)	119 (114.3)	>0.05
No	79 (72.9)	107 (113.1)		No	47 (42.3)	61 (65.7)	
Garlic				Garlic			
Yes	79 (66.6)	91 (103.4)	<0.01	Yes	88 (89)	139 (138)	>0.05
No	37 (49.4)	89 (76.6)		No	28 (27)	41 (42)	
Chamomile				Chamomile			
Yes	24 (31)	55 (48)	<0.05	Yes	38 (50.2)	90 (77.8)	<0.01
No	92 (85)	125 (132)		No	78 (65.8)	90 (102.2)	
Nigella				Nigella			
Yes	83 (74.9)	108 (116.1)	<0.05	Yes	90 (89.7)	139 (139.3)	>0.05
No	33 (41.1)	72 (63.9)		No	26 (26.3)	41 (40.7)	

observed for the use of mustard, garlic, nigella, and castor oil, but with *P* value <0.05. The students of the 2nd and 3rd professional year of study appeared using fenugreek more than expected, with statistical significance of *P* value <0.05. The details of cross-tabulation are presented in Table 11. The significant observed-to-expected counts are highlighted as black color.

Discussion

The use of CAMs has been increasing recently; however, the knowledge and perception regarding CAMs use among the students of the medical and pharmacy colleges from the University of Dammam, Saudi Arabia have not been documented lately. This study was conducted to assess the awareness, perception, and knowledge level of the students regarding CAMs. The respondents were females for most part followed by a fourth proportion of male students, and the majority of the students belonged to the age group between 21 and 23 years. It is quite pertinent to mention here that the gender distribution and age group are characteristic hallmarks of the academia in this region. It represents true enrollment of the students (gender-wise)

Table 10: Use of CAMs by students of college of medicine and clinical pharmacy

Cross tabulation	Observed (Expected)		*P*
	College of participants (*N*=296)		
Personal use of	Medicine	Clinical Pharmacy	
Aloe			>0.05
Yes	30 (34.9)	96 (91.1)	
No	52 (47.1)	118 (122.9)	
Clove			<0.01
Yes	26 (50.7)	93 (68.3)	
No	100 (75.3)	77 (101.7)	
Cascara			<0.01
Yes	61 (84.7)	138 (114.3)	
No	65 (41.3)	32 (55.7)	
Cardamom			<0.01
Yes	32 (68.1)	128 (91.9)	
No	94 (57.9)	42 (78.1)	
Fennel			<0.01
Yes	14 (28.5)	53 (38.5)	
No	112 (97.5)	117 (131.5)	
Ginger			<0.01
Yes	83 (97.1)	145 (130.9)	
No	43 (28.9)	25 (39.1)	
Anise			>0.05
Yes	59 (66.8)	98 (90.2)	
No	67 (59.2)	72 (79.8)	
Fenugreek			<0.01
Yes	32 (45.1)	74 (60.9)	
No	94 (80.9)	96 (109.1)	
Mustard			>0.05
Yes	37 (43.1)	73 (66.9)	
No	79 (72.9)	122 (130.9)	
Castor oil			<0.01
Yes	35 (46.8)	75 (63.2)	
No	91 (79.2)	95 (106.8)	
Garlic			<0.01
Yes	46 (72.4)	124 (97.6)	
No	80 (53.6)	46 (72.4)	
Chamomile			>0.05
Yes	31 (33.6)	48 (45.4)	
No	95 (92.4)	122 (124.6)	
Nigella			<0.01
Yes	61 (81.3)	130 (109.7)	
No	65 (44.7)	40 (60.3)	

in this country. The studies conducted in the medical and pharmacy colleges in this region and South Asia revealed similar findings.[7-10] The study was conducted among the students of the College of Medicine and the College of Clinical Pharmacy and incorporated almost a similar number of the pharmacy and medical students. Authors tried to incorporate all students in equal numbers by breakdown of year of study; however, because of less enrollment, the students of the 4th professional year were less in numbers. The students of the 2nd professional year accounted for a quarter proportion followed by similar numbers for the 3rd, 5th, and 6th professional year.

Regarding their source of information, a third proportion of the respondents banked upon their family and friends concerning the use of CAMs followed by formal education and courses. Significant reason for this dependence on family regarding knowledge of CAMs is due to the fact that Arabic and Islamic plants are being used as folkloric in this region.[3] Moreover, it does not solely depend upon the education, because this legacy is transferred through generations. The recent induction of CAMs-related courses being taught in the higher study institutes, particularly in pharmacy curriculum of Saudi Arabia, also contributes as a valuable factor.[11]

Furthermore, regarding the use of natural products as CAMs, a huge proportion of the students reported using cascara personally and by their family members. According to the literature, there are scant research studies that can highlight the purpose of its use among the Saudi population, and this needs to be further investigated. However, the use of aloe, clove, fennel, fenugreek, castor oil, and chamomile was prevalent in the family of the students, but the students declined them in their personal use. Cross-tabulation revealed that aloe, clove, cardamom, fennel, garlic, fenugreek, and nigella use was prevalent among the males. On the other hand, the use of cascara, anise, and chamomile was prevalent among the females. Furthermore, a significant positive correlation was reported among personal use of CAMs with higher coefficient (*R*) values for cardamom. Additionally, the family use of CAMs appeared highly correlated with personal uses. This notion of use in the family can be attributed to the fact that most of these natural products are used traditionally as food condiment, flavoring agents, and beverages in addition to its conventional uses. With regard to their affiliation, the pharmacy students were observed using CAMs more than the medical students. The declined use by the students might have been caused by either dissatisfaction or lack of CAMs specialized educational practices, which have the potential to dissuade them from using it.[12] Considering the professional year of study of the students (i.e., year-dependent), increased use of CAMs was observed from the 2nd year to the 4th year. A strong justification for this concept is the fact that CAMs-related courses are taught during the 2nd to 3rd year in pharmacy curriculum. Hence, the education could have influenced their use.

Regarding perceptions about the use of CAMs, almost half of the students strongly agreed upon the integration of CAMs-related courses in medical and allied health education. This perception may have been driven from the affiliation of the students, that is, the colleges of pharmacy had courses of CAMs integrated in their pharmacy curriculum; hence, the pharmacy students were aware of the importance of CAMs in practice, and this has been reflected as high CAMs use. On the contrary, the students of the colleges of medicine do not have such provision; however, the association of

Table 11: Use of CAMs by breakdown of professional year in college of clinical pharmacy

Personal use of	Prof. year of study (observed and expected counts)					*P*
	2nd year	3rd year	4th year	5th year	6th year	
Aloe						
Yes	20 (20.8)	25 (18.0)	8 (8.9)	16 (17.2)	13 (17.2)	>0.05
No	55 (54.2)	40 (47.0)	24 (23.1)	46 (44.8)	49 (44.8)	
Clove						
Yes	26 (30.2)	47 (26.1)	21 (12.9)	13 (24.9)	12 (24.9)	<0.01
No	49 (44.8)	18 (38.9)	11 (19.1)	49 (37.1)	50 (37.1)	
Cascara						
Yes	55 (50.4)	55 (43.7)	30 (21.5)	34 (41.7)	25 (41.7)	<0.01
No	20 (24.6)	10 (21.3)	2 (10.5)	28 (20.3)	37 (20.3)	
Cardamom						
Yes	52 (40.5)	54 (35.1)	23 (17.3)	18 (33.5)	13 (33.5)	<0.01
No	23 (34.5)	11 (29.9)	9 (14.7)	44 (28.5)	49 (28.5)	
Fennel						
Yes	8 (17)	35 (14.7)	10 (7.2)	8 (14)	6 (14)	<0.01
No	67 (58)	30 (50.3)	22 (24.8)	54 (48)	56 (48)	
Ginger						
Yes	59 (57.8)	58 (50.1)	29 (24.6)	39 (47.8)	43 (47.8)	<0.01
No	16 (17.2)	7 (14.9)	3 (7.4)	23 (14.2)	19 (14.2)	
Anise						
Yes	37 (39.8)	38 (34.5)	23 (17)	31 (32.9)	28 (32.9)	>0.05
No	38 (35.2)	27 (30.5)	9 (15)	31 (29.1)	34 (29.1)	
Fenugreek						
Yes	31 (26.9)	31 (23.3)	11 (11.5)	17 (22.2)	16 (22.2)	<0.05
No	44 (48.1)	34 (41.7)	21 (20.5)	45 (39.8)	46 (39.8)	
Mustard						
Yes	20 (17.2)	20 (14.9)	9 (7.4)	10 (14.2)	9 (14.2)	>0.05
No	55 (57.8)	45 (50.1)	23 (24.6)	52 (47.8)	53 (47.8)	
Castor oil						
Yes	30 (27.9)	30 (24.2)	16 (11.9)	18 (23)	16 (23)	<0.05
No	45 (47.1)	35 (40.8)	16 (20.1)	44 (39)	46 (39)	
Garlic						
Yes	49 (43.1)	54 (37.3)	23 (18.4)	22 (35.6)	22 (35.6)	<0.05
No	26 (31.9)	11 (27.7)	9 (13.6)	40 (26.4)	40 (26.4)	
Chamomile						
Yes	15 (20)	20 (17.3)	14 (8.5)	15 (16.5)	15 (16.5)	>0.05
No	60 (55)	45 (47.7)	18 (23.5)	47 (45.5)	47 (45.5)	
Nigella						
Yes	51 (48.4)	55 (41.9)	23 (20.6)	32 (40)	30 (40)	<0.05
No	24 (26.6)	10 (23.1)	9 (11.4)	30 (22)	32 (22)	

affiliation with perception was not significant (>0.05), and the students of the colleges of medicine had a positive perception, with observed count being the same as expected count, that is, $N = 97$ (observed), $N = 98$ (expected). This positive perception about adding CAMs-related courses in the medical curriculum was also reported by a study conducted in a different university of Saudi Arabia.[12] In addition to this, studies conducted in other regions reported that the students appeared confused about the additional contents and information that might add to their already heavy course load in the curriculum and, hence, tend to have a negative perception about addition of courses.[13] A third proportion perceived lack of scientific evidences as a barrier toward the use of CAMs. This finding has been reported by a number of previous studies in the region as well as the country.[12,13] A third proportion was not confident of CAMs being appropriate to use in the disease state management. This perception can be a result of the low knowledge of the respondents. Natural products have a history of being used as an adjunct therapy for disease state management. Additionally, recent literature reports the use of CAMs in highly sophisticated and complicated diseases such as cancers.[3] Furthermore, a third segment remained neutral to the notion of CAMs use being a health risk for the public, followed by similar numbers

regarding the perception that CAMs have fewer side effects. One of the major issues of CAMs is the lack of toxicological and safety studies available as well as anecdotal studies documenting interactions with conventional medicines, which impart low confidence to the user. Moreover, some of the natural products have been banned in some countries due to their toxic/adverse effects.[14,15]

Nearly half of the students remained neutral, and a third segment agreed with the perception of legalities being a barrier to the use of CAMs. In this context, it is pertinent to mention that the use of natural products differs geographically, culturally, and traditionally.[3] In addition, the active ingredient and potency of the plants vary, which needs proper sophisticated quality control methods and approval of the regulatory agencies.[14,16] A fourth proportion of the target segment agreed with the perception of a pharmacist being a patient counselor on CAMs use. Studies emphasize the importance of a pharmacist in such situations, because a pharmacist is in the best position to educate patients on the safe use of such products.[14]

The students were also asked questions related to their attitudes toward CAMs use. Almost half of the target segment acknowledged using CAMs, and a similar fraction agreed that their usage of CAMs is based on family recommendation. The variable of colleges had a significant negative correlation with the attitudes such as the use of CAMs for one's health (−0.256), being effective (−0.225), and the use of CAMs based on family recommendation (−0.147). This highlights that the domain of the study also influences the attitudes. A significant positive correlation was reported between using CAMs for health and; CAMs being effective (0.361), CAMs use based on family recommendation (0.350). This notion of using CAMs based on family recommendation can be attributed to the fact that natural products have traditional use in the Arab world; hence, this legacy is transferred through generations.

The questionnaire also tested the knowledge of the respondents regarding CAMs on 10 point scoring items. Almost half of the students had no knowledge about CAMs followed by slightly greater than a fourth segment having low knowledge. Very few respondents had adequate knowledge. No student had excellent knowledge. In congruence to the studies conducted in different parts of the country and the region, the knowledge is not adequate, and there is a growing need to incorporate CAMs in the education curriculum; hence, our findings confirm the phenomenon.

The study revealed that the use of natural products is influenced by gender, because some of the CAMs were more prevalent in males and vice versa; however, further investigation is needed to find out their intended purpose.

Conclusion

The use of CAMs has increased among the Saudi students. It is partly influenced by their traditional use and somewhat by the recent induction of CAMs-related education in pharmacy. There is a positive perception and attitude toward CAMs use, and the students of the medical background also call for including CAMs-related courses in their curriculum. However, the knowledge regarding the subject is inadequate. Lastly, gender has the potential to influence the use of particular CAMs. Further study to document the intended purpose of the use of different CAMs among males and females is recommended to develop in-depth understanding of its correlation with gender.

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Conflicts of interest

There are no conflicts of interest.

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