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Medical students' knowledge and attitude towards complementary and alternative medicine – A survey in Ghana



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ABSTRACT

Interest, use of and research into Complementary and Alternative Medicine (CAM; 補充與替代醫學 *bǔ chōng yǔ tì dài yī xué*) is on the increase in recent times even in developed countries. It may therefore be appropriate if medical students who would become future physicians possess adequate knowledge and better attitude towards CAMs. This study assessed medical students' knowledge of, attitude towards, and usage of CAM as well as their opinion about integrating CAMs into the medical curriculum. In a cross-sectional study, 203 medical students in 2nd, 3rd and 4th year classes completed a questionnaire. Data was analyzed using SPSS 18 and GraphPad 5.01. Association between different variables was tested. The overall mean knowledge score was 19.6%. Students in higher years of study were significantly more knowledgeable in CAMs ($p = 0.0006$). The best known CAM was herbal medicine (63.6%), with relatives and friends being their main source of information. Students' attitude towards CAM was good (75.1%) with majority (71.5%) favouring introduction of CAM into the medical curriculum; preferably at the preclinical level (67.5%). Year of study, gender and locality where student grew up did not significantly affect attitude towards CAM use. Up to 117 (59.0%) of the students had ever used CAM especially herbal medicine. Although students in this study were deficient in knowledge on CAMs, their attitude and usage was good. Herbal medicine was the best known and used CAM. Majority of the students believed knowledge on CAM would be beneficial to their practice hence, desirous of its introduction into their medical curriculum.

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1. Introduction

Advances of scientific research have brought about better understanding of diseases and mechanism of action of allopathic medicines. However, a good proportion of the world's population, even in developed countries, continue to depend on Complementary and alternative medicines (CAM; 補充與替代醫學 *bǔ chōng yǔ tì dài yī xué*) which are a group of varying medical and health systems, practices and products not usually considered as part of

conventional medicine.¹ A study in the United States of America in 2007 reported that almost 4 out of 10 adults had used some form of CAM within the previous year.² Also in 1998, the US public is estimated to have spent between \$36 and \$47 billion on CAM therapies.¹ This increasing patronage of CAM is driven by its perceived success in recovering, healing, improving health, and more importantly, perceived lack of side effects, lower cost, and prompt attention compared to conventional medicines and practice.^{3,4}

In Africa, it is estimated that one traditional healer takes care of the health needs of every 500 people especially in rural areas and up to 80% of the population use traditional medicine for their primary health care needs.^{5,6} In recognizing the role played by these traditional healers, WHO is encouraging countries to promote and integrate traditional medical practices in their health care systems.⁶

The success or otherwise of integrating CAM and conventional medical practice into the future healthcare system worldwide

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largely depends on the knowledge and attitude that physicians and other health workers would have with regards to CAM.⁷ Assessing medical students' attitude towards CAM would measure the possibility of this integration since as future doctors; they are both the future policy formulators and implementers.⁸ Education on CAM has been found to lead to the development of more positive attitudes towards CAM, and this has enhanced the inclusion of CAM into the curricula of medical schools in the USA.^{9–11}

Data from developing countries on knowledge and perception of medical students towards CAM is limited. Currently, there is no published data in relation to this topic from Ghana. This study therefore assessed the knowledge, attitude towards, and usage of CAM among medical students of the University for Development Studies, one of the four medical schools in Ghana. Currently, CAM is not part of the Problem Based Learning curriculum in UDS, so the study would also assess the students' attitude towards its inclusion into the medical curriculum.

2. Method

2.1. Study design and setting

This was a cross sectional study involving all 2nd, 3rd and 4th year medical students of the University for Development Studies in Tamale, Ghana. Using previously published data, a structured questionnaire was designed.^{12–14} The questionnaire gathered information on respondents' demographic data, knowledge, attitude and usage of complementary and alternative medicine. A pilot study of the questionnaire involving six students from the 3rd and 4th year medical classes was undertaken to determine the face validity of the questionnaire and also correct ambiguities. Second year students were not available on campus at the time of piloting the questionnaire. In addition to the students who took part in the piloting, all first year medical students who in this university read preparatory subjects were also excluded from the final study which took place between May and June, 2014. Whereas, the 2nd year class were administered the questionnaire after a block examination, the 3rd and 4th year students filled the questionnaire before a lecture session. Students voluntarily participated in the study after they were briefed on the research. They were each allowed at least 20 min to complete the questionnaire.

Prior approval for this study was obtained from the Ethics Committee of the School of Medicine and Health Sciences of the University for Development Studies.

2.2. Study variable determination and measurements

Knowledge, attitude and usage were measured using both closed and open ended questions. The closed ended 'yes' and 'no' questions mostly scored one point if it was affirmative and zero for a negative answer. Depending on the complexity of the open ended questions, points greater than one were awarded for correct answers. Due to the subjectivity of self-reported levels of knowledge, a more objective procedure was used to assess the student's knowledge by requesting respondents who claimed to possess knowledge on CAM (補充與替代醫學 *bǔ chōng yǔ tì dài yī xué*) or any of the modalities to define or describe them.

The level of knowledge of respondents on CAM was determined using 4 questions. The first question, which measured awareness, required a yes or no answer as to whether respondent knew what CAM was. The second and third questions were open ended question asking respondent to define CAM and list four examples. Respondent's definition of CAM was compared with that of the National Centre for Complementary and Alternative Medicine

(NCCAM) in the US, and a maximum of two points were scored for a right answer. Each correct example of a CAM scored 1 point. Question four, was a table of 17 CAM modalities asking respondents if they had heard of each of the modalities, first source of information, and a brief definition of the CAM if they had knowledge on each specific CAM. The listed CAM modalities were; Homeopathy, naturopathy, acupuncture (針灸 *zhēn jiǔ*), ayurvedic medicine, aromatherapy, chiropractic, faith healing, massage therapy, Traditional African healing, iridology, hypnosis, meditation, yoga, reflexology, energy medicine, herbal medicine and biofeedback. A respondent agreeing to have ever heard of any of the CAM modalities scored 0.5 of a point, while one point was awarded for the correct description or definition of a listed CAM modality. A total of 8.5 points was scored for being aware of all the CAM modalities, while accurate definition or description of all the listed CAM modalities scored 17 points. The mean knowledge scores were obtained for each class, gender and locality where a student grew up.

Attitude was measured using 9 close-ended questions requiring a Yes or No answer. One open-ended question asked of the respondent's reaction if a patient asked for recommendation of CAM. A positive response scored one while a negative/indifferent answer scored zero. To assist respondents who had limited knowledge on CAM to appropriately respond to questions that would measure their attitude, the NCCAM definition was provided and respondents informed that a previous table (Question 4) contained a list of various CAM modalities. Overall mean attitude score was obtained for each class, gender and locality of early life of the respondent.

Knowledge and attitude were further categorized as poor when scores were less than 50% or good, when scores were 50% or more.

Level of usage of CAM was assessed using two questions; if respondent had ever used CAM, and whether they were satisfied with the CAM used.

2.3. Statistical analysis

Data was entered into Microsoft Excel, and analyzed using GraphPad Prism, Version 5.01 (GraphPad Software Inc., San Diego CA) and Statistical Package for the Social Sciences (SPSS), version 18 (SPSS Inc, IBM, Chicago, IL, USA). Internal consistency of the questionnaire was assessed by Cronbach's alpha value. Associations between participants' demographic characteristics and both knowledge and attitude scores were assessed using the Chi-square test. The mean scores of knowledge and attitudes were compared using the independent t-test and one-way Analysis of Variance (ANOVA), where appropriate. Relationship between knowledge and attitude scores was determined by calculating the Pearson's correlation coefficient. Statistical significance was assumed at $p < 0.05$ and at a confidence interval of 95%.

3. Results

3.1. Demographic profile

A total of 284 questionnaires were administered out of which 203 were completed and returned giving a response rate of 71.5%; (2nd year $n = 97/124$, 78%; 3rd year $n = 62/83$, 75%; 4th year $n = 44/77$; 57%). The Cronbach's alpha value for the questionnaire was 0.85. The mean age (standard deviation) of the respondents was 22.35 (± 2.248) years. As shown in Table 1, majority of respondents were males 125 (61.6%); grew up in the urban areas of Ghana, 116 (56.7%); were followers of the Christian religion, 159 (78.3%). Most of them were 2nd year medical students, 97 (47.8%).

Table 1
Demographic characteristics of respondents.

Item	Subgroup	Number	Percentage
Gender	Male	125	61.6
	Female	78	38.4
Year of study	2 nd year	97	47.8
	3 rd year	62	30.5
	4 th year	44	21.7
Religion	Christianity	159	78.3
	Islam	43	21.2
	Eckankar	1	0.5
Locality where one grew up	Rural	88	43.3
	Urban	115	56.7

3.2. Students' knowledge on CAM (補充與替代醫學 bù chōng yǔ tì dài yī xué)

The ANOVA showed a statistically significant difference in overall knowledge among students of different year groups, with students at higher levels obtaining higher scores ($p = 0.006$) as reported in Table 2. Out of 32.5 knowledge score, the mean scores for the various year groups were; 2nd year (4.99), 3rd year (6.26) and 4th year (7.83). The overall mean knowledge score was 6.36, equivalent to 19.6% of maximum score. Awareness of CAM, represented by ever heard of the listed CAMs scored highest with 39.0% but total scores for the definition of individual CAMs was 9.9%. The claim by the students of knowing what CAM is, scored higher than the CAM definition. (14.3% vs 10.7%). Although male students obtained higher knowledge score than the females, the differences were not significant (18.7% vs 17.9%; $p = 0.635$). Students who grew up in the urban areas scored higher than those from rural areas, however, the differences were not significant when knowledge scores were stratified by locality in which participants grew up using one-way ANOVA (18.6% vs 18.2%; $p = 0.838$).

Table 3 shows the detailed knowledge score of the 17 CAMs listed in this study. The CAMs that were ever heard of by less than 20% of the students and their corresponding levels of correct definition scores were as follows; Aromatherapy (15.5; 6.3), Biofeedback (9.4; 0.0), Naturopathy (8.5; 0.8), Reflexology (6.9, 1.0), Ayurvedic medicine (6.1; 1.5), Energy medicine (5.8; 0) and Iridology (2.3; 0.8). The five most commonly heard CAMs and their corresponding correct definition scores were Herbal medicine (88.1; 59.5), Traditional African Healing (75.1; 27.1), Acupuncture (針灸 zhēn jiǔ) (73.4; 43.4), Massage therapy (70.1; 23.8) and Yoga (66.1; 15.7). With the exception of Homeopathy, Iridology, Reflexology and Biofeedback, a greater proportion of students in the higher years, especially the 4th year students had heard of all the other CAM modalities with significant differences in relation to Acupuncture ($p = 0.01$), Hypnosis ($p = 0.007$) and Meditation ($p = 0.0004$). The association between year of study and correct definitions for the modalities was significant for several modalities

Table 2
Mean knowledge scores on CAM categorized by year of study, gender and locality.

Statement (score)	Year of study				Gender		Locality	
	2nd	3rd	4th	% Of average	Male	Female	Urban	Rural
Do you know what CAM (補充與替代醫學 bù chōng yǔ tì dài yī xué) is? (1)	0.07	0.18	0.18	14.3	0.16	0.08	0.11	0.15
Definition of CAM (2)	0.06	0.26	0.32	10.7	0.22	0.10	0.14	0.23
List four examples of CAM (4)	0.20	0.49	0.5	9.9	0.42	0.23	0.27	0.44
Heard of the 17 listed CAM modalities? (8.5)	2.91	3.23	3.81	39.0	3.16	3.26	3.28	3.1
Description of the listed CAM modalities? (17)	1.75	2.10	3.02	13.5	2.13	2.14	2.24	2.00
Knowledge score total (32.5)	4.99	6.26	7.83	19.6	6.09	5.81	6.04	5.92
Percentage of total	15.4	19.3	24.1		18.7	17.9	18.6	18.2
p-values	0.0006*				0.635		0.838	

including Ayurvedic medicine ($p = 0.026$), Aromatherapy ($p = 0.009$), Traditional African Healing ($p = 0.004$), Faith healing ($p = 0.0009$), Hypnosis ($p = 0.007$) and Meditation ($p = 0.009$). In relation to gender, male students heard of a greater number of modalities (9) than females (8). Whereas the male students were significantly aware of acupuncture ($p = 0.028$), the females were better aware of Aromatherapy ($p = 0.046$) and Massage therapy ($p = 0.031$). Students who grew up in urban locations were also aware of greater number of modalities (11) than their rurally located counterparts (6). In terms of locality of growing up, awareness was only different for Ayurvedic medicine, ($p = 0.043$) where rural students had greater scores than their urban counterparts.

3.3. Sources of awareness and knowledge on CAMs

As shown in Table 4, television was the most common source of first encounter with the following CAM modalities; Acupuncture (50.0%), Massage therapy (58.1%), Yoga (54.9%), Meditation (48.1%), Hypnosis (47.2%) and Chiropractic (45.5%). Relatives and friends at home first made respondents aware of Herbal medicine (38.1%) and Traditional African Healing (34.5%). For some students; school was the first source of information on Herbal medicine (17.5%), Traditional African healing (26.7%) and hypnosis (19.4%). Books and journals were the sources of awareness for the following CAMs for some students; Yoga (15.4%), Meditation (20.8%) and Hypnosis (19.4%). Other media made up of radio, newsprint, and outdoor advert were the sources of awareness of Acupuncture (20.3%), Massage therapy (19.4%), Yoga (16.5%), Chiropractic (29.5%), and Homeopathy (42.2%). In the case of Faith healing, the church (33.8%) and television (32.4%) were the most common sources of information. Information on Homeopathy was mostly sourced from the internet (11.1%). Chiropractic (4.5%) and Massage therapy (3.2%) were the only CAMs students became aware of at health facilities such as hospitals and spas.

3.4. Attitude of students towards CAMs

The overall mean attitude score of the students in this study was 7.51 out of 10 (75.1%). Table 5 shows the mean attitude scores of the students categorized according to their year of study, gender and locality of early life. The 3rd year class had the highest score of 7.694, followed by the 4th year (7.659) with the 2nd year class scoring the lowest of 7.184 but these differences of attitude at the various levels of study were not significant ($p = 0.236$). The worst attitudes were poor encouragement of their future patients of combining CAM modalities with orthodox medicines (33.1%) and their negative responses or indifference when a patient asked them for recommendations on CAMs (57.0%). The best attitudes were in relation to necessity and readiness to ask patient of previous usage of CAM (96.1%) and belief that CAM is beneficial to healthcare

Table 3
Level of awareness and accurate description of listed CAM modalities by the students (%).

CAM modality		Year of study				p-value	Gender			Locality		
		2nd	3rd	4th	% Of average		Male	Female	p-value	Urban	Rural	p-value
Homeopathy	EH	20.6	32.2	27.3	26.7	0.253	28.8	20.6	0.190	22.6	29.6	0.264
	CD	0.0	16.1	23.0	13.0	0.378	0.8	1.3	0.737	0.0	2.3	–
Naturopathy	EH	6.2	8.0	11.4	8.5	0.575	9.6	5.2	0.252	5.2	11.4	0.108
	CD	0.0	0.0	2.3	0.8	0.165	0.8	0.0	–	0.0	1.1	–
Acupuncture (針灸 zhēn jiū)	EH	60.4	75.8	84.0	73.4	0.010*	76.0	61.5	0.028*	72.2	68.2	0.539
	CD	41.2	43.5	45.5	43.4	0.890	44.8	39.7	0.481	47.0	37.5	0.179
Ayurvedic medicine	EH	3.0	6.4	9.0	6.1	0.318	6.4	3.8	0.437	2.6	9.0	0.043*
	CD	0.0	0.0	4.5	1.5	0.026*	3.2	0.0	–	0.0	4.6	–
Aromatherapy	EH	11.4	14.6	20.4	15.5	0.361	10.4	20.6	0.046*	17.4	10.2	0.150
	CD	5.2	0.0	13.6	6.3	0.009*	4.8	6.4	0.624	6.1	4.5	0.633
Chiropractic	EH	26.8	27.4	34.0	29.4	0.659	27.2	30.8	0.586	33.0	22.8	0.108
	CD	5.2	0.0	2.3	2.5	0.168	3.2	2.6	0.796	4.3	1.1	0.182
Faith healing	EH	42.2	54.8	59.0	52.0	0.115	44.8	57.6	0.075	53.0	45.4	0.286
	CD	15.5	19.4	43.2	26.0	0.001*	21.6	24.4	0.650	23.5	21.6	0.752
Massage therapy	EH	64.0	64.6	81.8	70.1	0.085	62.4	77.0	0.031*	68.6	67.0	0.804
	CD	14.4	27.4	29.5	23.8	0.055	22.4	20.5	0.752	23.5	19.3	0.478
Traditional African Healing	EH	69.4	67.4	88.6	75.1	0.316	81.6	79.4	0.712	80.8	80.6	0.973
	CD	18.6	19.4	43.2	27.1	0.004*	24.0	24.4	0.954	25.2	22.7	0.683
Iridology	EH	3.0	1.6	2.2	2.3	0.840	3.2	1.2	0.394	2.6	2.2	0.879
	CD	0.0	0.0	2.3	0.8	0.165	0.8	0.0	–	0.0	2.2	–
Hypnosis	EH	44.4	50.0	72.8	55.7	0.007*	52.8	51.2	0.834	57.4	45.4	0.092
	CD	7.2	8.1	20.5	11.9	0.045*	12.0	7.7	0.329	10.4	10.2	0.962
Meditation	EH	47.4	63.0	81.8	64.1	0.0004*	58.4	61.6	0.660	59.2	60.2	0.875
	CD	1.0	8.1	13.6	7.6	0.009*	7.2	3.8	0.327	6.1	5.7	0.904
Yoga	EH	59.8	61.2	77.2	66.1	0.117	60.0	70.6	0.130	67.8	59.0	0.201
	CD	13.4	17.7	15.9	15.7	0.756	12.8	19.2	0.217	14.8	15.9	0.826
Reflexology	EH	8.2	8.0	4.6	6.9	0.720	8.0	6.4	0.676	7.0	8.0	0.789
	CD	3.1	0.0	0.0	1.0	0.192	1.6	1.3	0.856	1.7	1.1	0.726
Energy Medicine	EH	5.2	3.2	9.0	5.8	0.420	6.4	3.8	0.437	7.8	2.2	0.084
	CD	0.0	0.0	0.0	0.0	–	0.0	0.0	–	0.0	0.0	–
Herbal medicine	EH	83.6	92.0	88.6	88.1	0.288	86.4	88.4	0.671	87.0	87.6	0.909
	CD	50.5	64.5	63.6	59.5	0.146	54.4	62.8	0.240	60.9	53.4	0.289
Biofeedback	EH	14.4	4.8	9.0	9.4	0.101	10.4	11.6	0.801	11.4	10.2	0.808
	CD	0.0	0.0	0.0	0.0	–	0.0	0.0	–	0.0	0.0	–

EH – Ever heard of this type of CAM?, CD – Correct definition/description of CAM modality.

*Statistically significant.

(87.9%). The attitude towards the introduction of CAM into the medical curriculum was 71.5%. There was no difference in overall attitude between males and females (7.667 vs 7.304, $p = 0.225$), neither was there a significant difference in attitude towards CAM between students growing up in rural or urban localities (7.420 vs 7.461, $p = 0.891$). Majority of the students (89.2%) in this study were never asked questions related to their previous use of CAM by their physicians.

3.5. Personal experiences with CAMs

The level of personal usage of and satisfaction with CAM modalities is as shown in Table 6. The highest level of use of CAM was among the 4th year students (65.9%) and the lowest among the 2nd

year students (54.6%). However, it was the 2nd year students who had a higher level of satisfaction (81.1% vs 72.4%). There was no significant difference in the level of usage based on the year of study ($\chi^2 = 1.626$, $p = 0.4436$). More male students used CAMs (58.4% vs 56.4%) than females; however, the females were more satisfied with the results from their usage of CAM (79.5% vs 75.3%). The difference between the usage and level of satisfaction after use, when stratified according to the gender, was not significant. Although more rural dwellers used CAMs (62.5% vs 53.9%), they were less satisfied with the outcome of the CAMs used (74.5% vs 79.0%). Majority of the students who had ever used CAM (76.5%) were encouraged by relatives and friends while 11.3 % were by herbalists. While some students stated they were currently using a CAM modality for an ailment, the last time majority of them (55.4%)

Table 4
Sources from which respondents first heard of CAM modalities.

CAM Modality	TV	Relatives and friends	School	Books and journals	Media	Church	Internet	Health facility
Herbal medicine	19.8	38.1	17.5	9.5	13.5	0.0	1.6	0.0
Traditional African Healing	21.6	34.5	26.7	4.3	12.9	0.0	0.0	0.0
Acupuncture	50.0	4.7	7.8	10.9	20.3	0.0	6.3	0.0
Massage therapy	58.1	5.4	3.2	5.4	19.4	0.0	5.4	3.2
Yoga	54.9	3.3	4.4	15.4	16.5	0.0	5.5	0.0
Meditation	48.1	3.9	9.1	20.8	13.8	1.3	3.9	0.0
Hypnosis	47.2	0.0	19.4	19.4	9.7	0.0	4.2	0.0
Faith healing	32.4	7.4	0.0	13.2	11.8	33.8	1.5	0.0
Chiropractic	45.5	4.5	4.5	9.1	29.5	0.0	2.3	4.5
Homeopathy	26.7	8.9	4.4	6.7	42.2	0.0	11.1	0.0

*Values are all in percentages. The modalities listed in Table 4 were the ten best known of the 17 included in this study.

Table 5
Mean scores for attitude towards CAM categorized by year of study, gender, and locality.

Statement	Year of study			% Of average	Gender		Locality	
	2nd	3rd	4th		Male	Female	Urban	Rural
Believe CAM is beneficial to healthcare?	0.80	0.952	0.886	87.9	0.832	0.923	0.887	0.841
Will recommend CAM to a patient	0.64	0.726	0.750	70.5	0.664	0.731	0.687	0.693
Patients have right to choose between CAM and orthodox medicine (OM)	0.845	0.839	0.886	85.7	0.888	0.795	0.835	0.875
Will encourage the use of CAM together with OM	0.320	0.355	0.318	33.1	0.336	0.321	0.322	0.341
CAM should be introduced in medical course	0.629	0.790	0.727	71.5	0.656	0.769	0.687	0.716
Ready to be trained more on CAM after becoming a doctor?	0.649	0.694	0.682	67.5	0.648	0.705	0.670	0.670
Necessary to ask every patient of previous usage of CAM during history taking	0.959	0.968	0.955	96.1	0.96	0.962	0.957	0.966
Will ask patient of previous CAM use when I qualify as a doctor	0.959	0.968	0.955	96.1	0.968	0.949	0.965	0.955
It is necessary for a doctor to have good knowledge of CAM	0.835	0.806	0.932	85.8	0.816	0.897	0.826	0.875
Positive reaction should a patient ask you recommend a CAM?	0.546	0.597	0.568	57.0	0.536	0.615	0.626	0.489
Attitude score (10)	7.186	7.694	7.659	75.1	7.304	7.667	7.461	7.420
Attitude (%)	71.9	76.9	76.6		73.0	76.7	74.6	74.2
p-values	0.236				0.225		0.891	

had used a CAM modality was more than 3 years which is responsible for up to 54.7% of the students unable to recollect the names of the CAM modalities, herbal plants or their products used. For students who named the CAM modality used, 88.6% used herbal medicine with the rest being other forms of CAM. The most common ailments the CAMs were used to treat were Malaria (43.6%) and pains (12.8%).

4. Discussion

Direct supervision by one of the authors who was involved with the respondents' academic works might have contributed to the high response rate of 71.5% especially when compared with rates from some previous studies.^{12,15–17} In this study, there was no CAM that at least a student had not heard of but in all cases, students were less knowledgeable when asked to define or describe the CAM modality they claimed to have heard of. None of the students was able to define modalities such as Biofeedback and Energy Medicine with 1% or less correctly describing Naturopathy, Iridology and Reflexology. Studies have shown that knowledge on CAM modalities differ among countries. Whereas in Singapore and Pakistan, acupuncture is the best known CAM, American students consider massage, herbal medicine and meditation as their best known CAMs.^{12,15,18} The best heard of and known CAM modality in this study was Herbal Medicine (88.1%; 59.5%). A greater proportion of the students in this study (38.5%) stated that their knowledge or use of herbal medicine was influenced by relatives and friends. Also, in this study herbal medicine was the most commonly used CAM. The level of CAM usage in this study is higher compared to usage among medical students in Pakistan but lesser than that reported in USA.^{12,19} These results and the fact that 80% of Africans are known to use traditional medicine confirms the assumption that having a family member using a CAM modality, among other factors such as the environment, personal interest, religious beliefs, and cultural background

influence a person's knowledge and attitude towards the use of CAM.^{5,6,18,20,21} The knowledge score for traditional African medicine was lower than herbal medicine since most students overlooked the spiritual aspect of traditional African healing.²² Although CAMs such as Acupuncture (針灸 zhen jiu), Hypnosis, Massage therapy, Yoga are not traditionally practiced in Ghana, the students had a fair knowledge of them with television being their main source of information. This study showed that the overall knowledge of the medical students on CAM was poor with majority (85.7%) of them not even aware of the term CAM, a result comparable to those from Ireland, Turkey and Pakistan.^{12,14,21} The knowledge and usage of CAM among medical students in USA was however better than students in this study possibly due to the integration of CAM into their medical curriculum.^{23,24} There was no significant difference in knowledge of CAM modalities with respect to gender and locality where a person grew up, although the males and the urban dwellers had better knowledge. In Turkey the males were also more knowledgeable than the females.¹⁴ This study, like others has demonstrated a highly significant association between advancing year of medical education and increased knowledge of students on CAM.^{15,18} Arguably, advancing year and knowledge are covariates, however, the effect of year of study on knowledge about CAM observed in the current study could be attributed to the 3rd and 4th years having more years of a community based education and service (COBES), an academic programme in this university during which students spend at least 4 weeks in a rural health facility where they effectively interact with the prevailing health systems. At the end of COBES, students are expected to present a report on the health care systems of the communities which are mostly herbal or traditional medicine and practices.

There was a high overall attitude of the students towards the use of CAM in this study (75.1%) which was however lower than values recorded in countries such as USA (>80%) and Singapore (85.0%).^{12,21,23} Students of higher years of study, females and urban

Table 6
Level of usage and satisfaction of CAM by respondents.

Statements		Year of study			Gender		Locality	
		2nd n = 97	3rd n = 62	4th n = 44	Male n = 125	Female n = 88	Urban n = 115	Rural n = 88
Ever personally used CAM for any ailment?	Yes	54.6	56.5	65.9	58.4	56.4	53.9	62.5
	No	45.4	43.5	34.1	41.6	43.6	46.1	37.5
Satisfied with the outcome of the treatment using the CAM?*	Yes	81.1	74.3	72.4	75.3	79.5	79.0	74.5
	No	18.9	25.7	27.6	24.7	20.5	21.0	25.5

*Values based on the number of student who ever used CAM.

dwelling students have better attitudes but the differences were not significant. Attitude correlated positively with knowledge in this study ($r = 0.27$, $p < 0.0001$), which agrees with earlier reports.^{13–15,20} Almost all the students agreed that there was the need for the doctor to ask a patient about their previous usage of CAM and that they will ask when they become doctors. This result is encouraging since patients' CAM usage information would assist the doctor to better manage the patient's condition in relation to diagnosis, prescribing and counseling as indicated by 42.9% of the respondents. A similar attitude was observed among Turkish medical students.¹³ Majority of the students (85.5%), just as reported in other studies were of the opinion that it is necessary for a doctor to have adequate knowledge on CAM. Most students in this study and other previous works clearly indicate that most medical students and physicians are desirous of the introduction of CAM into the medical school curriculum.^{13,18,24} Whereas previous studies have shown that majority of medical students support the combination of CAM with conventional medicines, fewer students (33.1%) in this study agreed to this combination.^{12,25} This attitude could possibly be due to the students' limited knowledge on CAM, with the apprehension of potential interactions between the herbal products and the conventional medicine being a reason, although several CAMs do not involve chemicals. A fifth of the students stated possible drug-drug interaction as a reason for which a doctor must ask patients of their previous use of CAMs during history taking.

In this study, the Television was the main source of information on most of the CAMs, with family relations, friends and schools also providing knowledge especially in relation to Herbal medicine and traditional African medicine. The high level of knowledge of the students about acupuncture, hypnosis, and yoga might have been as a result of film shows originating from Asian countries such as India and China where these practices are most prevalent.^{26,27} Knowledge on homeopathy and chiropractic medicine was possibly acquired from adverts on television from spas, and clinics where these CAMs are practiced. The church and television being the main source of knowledge on Faith healing was not surprising since most respondents are Christians who believe in prayers and also several Ghanaian television stations show healing sessions by miracle performing pastors. The rather lower knowledge on faith healing can be attributed to not using the term 'prayers' which most students are familiar with.

Just like in studies from other countries, most respondents were desirous of the introduction of CAM into medical school curriculum in the form of lectures during the pre-clinical stage of the medical programme.^{12,15,21,28}

This study is limited by the fact that it was conducted in one medical school and only at preclinical level and so cannot be generalized to cover all medical students and at all levels of study in Ghana. The challenge of giving retrospective accounts of knowledge and usage also introduced bias which could influence the results obtained in this study. At the preclinical level of a problem base learning curriculum which is followed in the University of the respondents, there is no substantial appreciation of disease and treatment mechanisms with their associated benefits and potential untoward effects, which could affect participants' attitude towards the use of CAMs.

5. Conclusion

Although all the CAMs (補充與替代醫學 *bǔ chōng yǔ tì dài yī xué*) listed had ever been heard of by at least one student, their overall knowledge on CAM modalities is poor. The most common CAM known by the students is Herbal medicine. Television played an important role in providing knowledge on CAMs but relatives

and friends greatly influenced attitude towards the use of the best known CAMs especially herbal medicine. Overall, the students have good attitude towards CAM. They are most likely to ask patients of their previous usage of CAM; recommend a CAM to a patient; and gladly accept the introduction of studies on CAM into their medical curriculum since they believe it is beneficial to healthcare. Majority of the students have used herbal medicine for an ailment and were satisfied with the results obtained. This means that with the integration of CAM into medical curriculum, future physician's attitude and usage of CAMs would see a tremendous increase which will go a long way to enable CAMs contribute towards the overall health needs of Ghanaians.

Competing interest

Authors have no conflict of interests, and the work was not supported or funded by any person or organization.

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