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Knowledge, Perception, Attitude and 'Willingness to use' towards Complementary and Alternative Medicine Amongst Medical Students in Usmanu Danfodiyo University, Sokoto-Nigeria

M.I. Umar[1], Samaila Usman[2], Kabiru Abubakar[1], Azeez R. Sheidu[3], & R.G. Tijjani [1*]

[1] Department of Pharmacology and Toxicology,
Usmanu Danfodiyo University,
Sokoto,
Nigeria.

[2] Department of Pharmacy, General hospital, Binji,
Sokoto,
Nigeria.

[3] FCT College of Nursing,
Gwagwalada,
Abuja,
Nigeria.

Email: rtgiaze1143@gmail.com

Abstract
Complementary and alternative medicine (CAM) is widely practised around the world. Approximately 80% of developing countries like Nigeria rely on CAM. The potential challenges faced by CAM, though not backed by credible scientific evidence, have caused differences in perception and attitude towards CAM Despite these challenges; studies have not sufficiently reported the attitude/behavior of medical, pharmacy and nursing students towards CAM. This study aimed to investigate knowledge, perception, attitude and 'willingness to use' towards CAM amongst UDUS medical, pharmacy, and nursing students. After obtaining consent of participants, structured questionnaire adopted from previous studies was administered to 300 participants to fill at their convenience. Information was extracted from filled questionnaires and scored using Microsoft Excel software. Data of socio-demographic characteristic, knowledge, attitude and willingness of study respondents obtained were analyzed using statistical package for social sciences (SPSS), version 20. Pearson's correlation was employed to explore the relationship between consumer knowledge, perception, attitude and 'willingness to use' towards CAM. Results obtained show that the participants had good knowledge of CAM as 83% have heard about it and use it and positive perception and attitude towards it. The result further revealed, across groups, a significant correlation between the participants knowledge and their perception, attitude, and 'willingness to use' towards CAM. However, willingness to recommend or use CAM was low (< 50%) amongst medical students as compared to pharmacy and nursing students.

Keywords: Traditional medicine, complementary and alternative medicine

Author for Correspondence

INTRODUCTION

Traditional medicine (TM), variously known as ethno-medicine, folk medicine, native healing, or complementary and alternative medicine (CAM), is an ancient and culture-bound method of healing that humans have used to cope and deal with various diseases that have threatened their existence and survival (Abdullahi, 2011). It is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses (WHO, 2001). On the other hand, a traditional healer is anybody recognized by the community as someone competent to provide health care by using plant, animal and mineral substances and other methods based on social, cultural and religious practices (WHO, 2001).

In Africa, the importance of traditional healers and remedies made from indigenous plants play a crucial role in the health of millions (Abdullahi, 2011). Many Africans believe that, although Western healing is effective in treating many illnesses, traditional healing is superior to Western healing in the treatment of psychiatric conditions (Robertson, 2006). According to the International Development Research Centre (IDRC), an estimate puts the number of Africans who routinely use these services for primary health care as high as 85% in Sub-Saharan Africa (Thorne *et al.*, 2002). In countries like Ghana, Mali, Zambia and Nigeria, the first line of treatment for 60% of children with high fever resulting from malaria is the use of herbal medicine (WHO, 2002).

In certain parts of the world, TM has been fully integrated into with practices of conventional medicine. Hospitals now offer CAM therapies with insurance coverage (IOMCCAM, 2005). TM is taught as part of school curriculum activities in medical schools in the USA (Malinowski, 2006; Harris *et al,* 2012). However, despite the widespread patronage TM enjoys in Africa, its regulation, standardization and integration into modern healthcare delivery system is highly relegated. The ethnocentric and medico-centric tendencies of the Western hegemonic mentality that are usually paraded by most stakeholders in modern medicine remains a very serious challenge (Abdullahi, 2011). In our communities, it is a general belief within the medical circle that TM defies scientific procedures in terms of objectivity, measurement, codification and classification. Furthermore, the acceptance of Western religion, education, urbanization and globalization phenomena in Africa is affecting the use of TM (Feierman, 2002) has noted a 'passionate ambivalence' towards African TM and plants in some segments of the African populations particularly among the educated elites. Teshome-Bahiru (2006) found out that the process of urbanization has greatly impacted on the use of TM in both rural and urban communities of Addis Ababa, Ethiopia, albeit both in positive and negative ways. Kiringe (2005) reported the negative impact of Western education and religion on the use of TM. Thus, scholars, in view of these challenges, suggest that both TM and conventional medicine be allowed to operate, develop and flourish independent of one another (Konadu, 2008; Oyelakin, 2009). Furthermore, in order to achieve proper integration of TM into modern healthcare delivery system like in other developed countries proper education must be given to the healthcare workers right from the undergraduate level. Despite the widespread rumors and perceptions towards the use of TM that are not backed by credible scientific evidence, studies have not sufficiently reported the attitude/behavior of students of Medical, Pharmacy, and Nursing schools towards CAM in Nigeria. As such, this study aimed to investigate western-trained health care practitioners' knowledge of and experiences with traditional African medicine. The assumption was that an understanding of western trained health care practitioners' attitudes towards traditional healing could contribute to guiding the proposed integration process (i.e., integrating traditional healing and western medicine) and its sustainability. The data obtained at the end of this study will

provide information on perception of TM amongst medical, pharmacy, and nursing students. This information will provide clues to policy makers in government and TM industries on the trend of TM in Nigeria. The data will also provide information that will create awareness on CAMs for both traditional and orthodox medicine practitioners.

MATERIALS AND METHODS

Questionnaire Design

A designed questionnaire which comprises of well-structured questions was adopted from a previous study (Ameade *et al.,* 2016). The questions were grouped into the following sections:

- Background or demographic characteristics of respondents that consists of 7 structured questions aimed at collecting socio-demographic data of the participants such as age, gender, level of study, course of study place of residence and access to medical facility/hospital
- Knowledge of CAM which consists of 7 structured questions aimed at obtaining data on the level of knowledge of participants of CAM.
- Perception towards CAM: This section consists of 10 structured questions aimed at obtaining data on how the participants perceive CAM. Questions in this section were designed on Likert scale with 5-point scale ranging from "strongly disagree", "disagree", "neutral", "agree", to "strongly agree".
- Attitude towards CAM: This section consists of 14 structured questions aimed at obtaining data on the behavioral attitude of respondents towards CAM. All the questions in this section were fashioned to be on Likert scale with 5-point scale ranging from "strongly disagree", "disagree", "neutral", "agree", to "strongly agree".
- Participants' willingness to recommend or use CAM: This section of the questionnaire consists of 13 structured questions aimed at obtaining data on the will of the respondents to recommend or use CAM. Questions in this section were fashioned to be answered "yes", "no" or "not sure".

Pilot Test

Before arriving at the final questionnaire, the initial design was first validated through a pilot-test by administering the questionnaire to 30 target participants (10 each to medicine, pharmacy and nursing, respectively). This test was carried out in order to eliminate error and ensure the questionnaire is understandable, reliable and trustworthy, and to estimate the time required to complete the questionnaire by target participants.

Inclusion Criteria

Respondents who fulfilled the following criteria were included in this study:

- Age of eighteen years and above
- Medicine, pharmacy, and nursing students from Usmanu Danfodiyo University Sokoto
- Four hundred level students and above

Sample Size Determination

As shown below, the sample size of respondents for this study was determined using Daniel's formula (Daniel 1999).

$$n = \frac{1.96^2 \times 0.27(1-0.27)}{0.05^2}$$

$$n = \frac{Z^2 P(1-P)}{E^2}$$

$$n = \frac{3.84 \times 0.27(0.73)}{0.0025} = 300$$

Where:
n = Sample size
Z = Level of confidence (1.96 for 95%)
P = Expected prevalence or proportion (0.27 for27%)
E = Error margin (0.05 for 5%)

Sampling Method

Convenience sampling methods were adopted to obtain the recommended sample size (300). The study sample was drawn from 3 different faculties (medicine, pharmacy and nursing) that were randomly sampled out of the other faculties around the college of Usmanu DanFodiyo University Sokoto. At the sampled points, samples were conveniently drawn from students that were interested in participating in the study.

Data Collection

Data obtained in this study was primarily collected from volunteer student participants with the aid of a questionnaire. Before administering the questionnaires, while their consent was sought, participants were briefly introduced the subject matter - the purpose and benefits of the research, and were assured of confidentiality of their information. After filling the questionnaires by study respondents, information were extracted from the questionnaires using Microsoft excel software.

Statistical Analysis

All data collected were presented as mean ± SD. Microsoft excel software was used to express the frequencies and percentages of the socio-demographic characteristic, knowledge, attitude and willingness of study respondents. Using SPSS (version 20), with respect to the social demographic (course of study), one-way ANOVA was used to investigate students' knowledge, perception, attitude and 'willingness to use' towards CAM while Pearson's correlation was employed to explore the relationship between their knowledge and perception, attitude and 'willingness to use' towards CAM.

RESULTS

Demographic Data of Participants

Socio-demographic data obtained in this study ((Table 1) reveal more male participants (medicine - 79.2%; pharmacy - 78%; nursing - 62.2%) than female participants participated in the study. Participants from 21-25 years of age constituted the highest number of participants; medicine (56.6%), pharmacy (75.3%), nursing (88.2%) followed by 26-30 years; medicine (41%), pharmacy (20.2%), nursing (10.7%). Amongst the participants group, those residing in urban places had the highest percentage; medicine (85.3%), pharmacy (77.9%), nursing (73%) of participant. On level of study of participants, 80.2% from 400 level and 19.8% from 500 level participated for medicine students, 35.6% from 400 level and 64.4% from 500 level participated for pharmacy students, while equal number of participants (50% each) were obtained from nursing students.

Table 1: Demographic data of respondents

		Percentage (%)		
		MBBS	Pharm	Nursing
Age (years)	≤ 21	0.00	3.40	1.10
	21-25	56.6	75.3	88.2
	26-30	41.0	20.2	10.7
	> 30	2.40	1.10	0.00
Gender	Male	79.2	78.0	62.2
	Female	20.8	22.0	37.8
Residence	Rural	14.7	22.1	27.0
	Urban	85.3	77.9	73.0
Level	400	80.2	35.6	50.0
	500	19.8	64.4	50.0
Access to Hospital	Easy	91.2	95.8	91.2
	Hard	8.80	4.20	8.80

Participants' Knowledge of CAM

Data obtained showed that participants had a good knowledge of CAM. More than 60% of the participants have heard about CAM before, used it, and considered it to be the source of livelihood (Figure 1). With respect to participants' knowledge of individual types of CAM, result obtained show that majority (on a scale of 3 points) reported good knowledge of herbs, spiritual healing, massage, meditation, hypnosis, and acupuncture with nearly poor knowledge of aromatherapy, Ayurveda, chiropractic, and oriental medicine (Table 2).

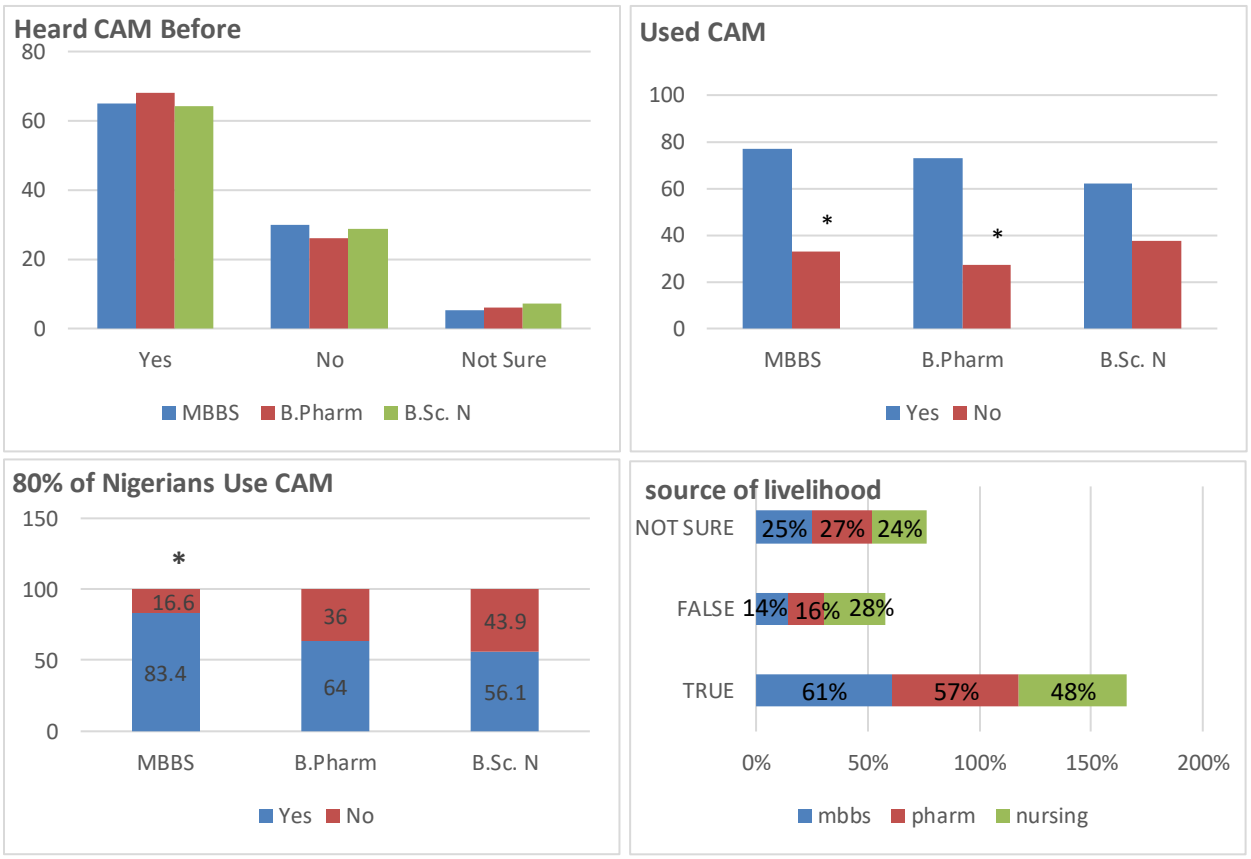


Figure 1: participants Knowledge of CAM

Table 2: Participants Knowledge of individual CAM

CAM Modalities	Score over 3		
	MBBS	B.Pharm	Nursing
Acupuncture	1.40	1.35*	1.63*
Aromatherapy	0.98	1.58	1.22
Ayurveda	0.64	1.14	0.90
Cupping	1.23	1.32	1.45
Chiropractic	0.74	0.78	0.89
Herbs	1.75^	2.09^	1.91
Homeopathy	1.27£	1.83£,$	1.45$
Hypnosis	1.47	1.52	1.35
Meditation	1.48	1.61	1.67
Massage	1.92	1.98	1.85
Oriental medicine	0.88	1.11	1.09
Spiritual healing	1.76	1.65	1.73
Yoga	1.21	1.19	1.36

Super scripts implies significance difference (p<0.05, one-way ANOVA). N=300

Participants' Perception of CAM

Results obtained in this study show that with respect to negative questions of perception on CAM that says 'Do you believe there are many "quacks" in complementary medicine?', 'Treatments not tested in scientifically recognized manner should be discouraged', 'complementary therapies are a threat to public health' and 'Effects of complementary therapies are usually the result of a placebo effect' medicine students scored the highest points followed by nursing students and then pharmacy students (Table 3). With respect to positive questions of perception on CAM that says 'Complementary therapies include ideas and methods from which conventional medicine could benefit' and 'A patient's expectations, health beliefs and values should be integrated into the patient care process', pharmacy and nursing students scored high points than medicine students (Table 3). This outcome reveals that pharmacy and nursing students, to a reasonable extent, perceived CAM more positively compared to medicine students.

Table 3: Participants Perception of CAM

S/no.	Statements	Score over 5		
		MBBS	Pharm	Nursing
1	A patient's expectations, health beliefs and values should be integrated into the patient care process	3.57@,£	3.94@	3.95£
2	Complementary therapies are a threat to public health	2.02^	1.46^,$	1.96$
3	Is it only naive/gullible people who go to complementary practitioners?	1.38	1.44	1.41
4	Do you believe there are many "quacks" in complementary medicine?	4.14	4.03	4.13
5	Treatments not tested in a scientifically recognized manner should be discouraged	2.67	2.26	2.42
6	Do you believe complementary medicine is more holistic than orthodox medicine?	1.40	1.59	1.40
7	Effects of complementary therapies are usually the result of a placebo effect	2.05	1.78	1.85
8	Do you believe that complementary medicine is better than medicine to treat psychological illness?	1.60	1.69	1.77
9	Complementary therapies include ideas and methods from which conventional medicine could benefit	3.47<	3.83<,>	3.53>
10	Most complementary therapies stimulate the body's natural therapeutic powers	3.24*	3.57*	3.44

Super scripts implies significance difference (p<0.05). N=300

Participants' Attitude on CAM

Results obtained in this study show that, on the scale of 5, more than 60% of participants agreed that 'they believe in alternative approaches in health care, CAM should be taught in medical school, providing information about herbal medicine is part of a doctor/pharmacist's professional responsibility, doctor's should know CAM methods and it is important to consult a health professional before using CAM' (Table 4). However, less than 50% of the participants' believed that treating condition with CAM is safer than using modern methods, patients on CAM hardly ever get better, and herbal medicine is unsafe and ineffective (Table 4). Majority of them (>50%) also believe that CAM has low status within medicine and is fairly unscientific (Table 4). These result outcomes indicate that the participants had positive attitude towards integration of CAM into medical school curriculum.

Table 4: Participants Attitude towards CAM

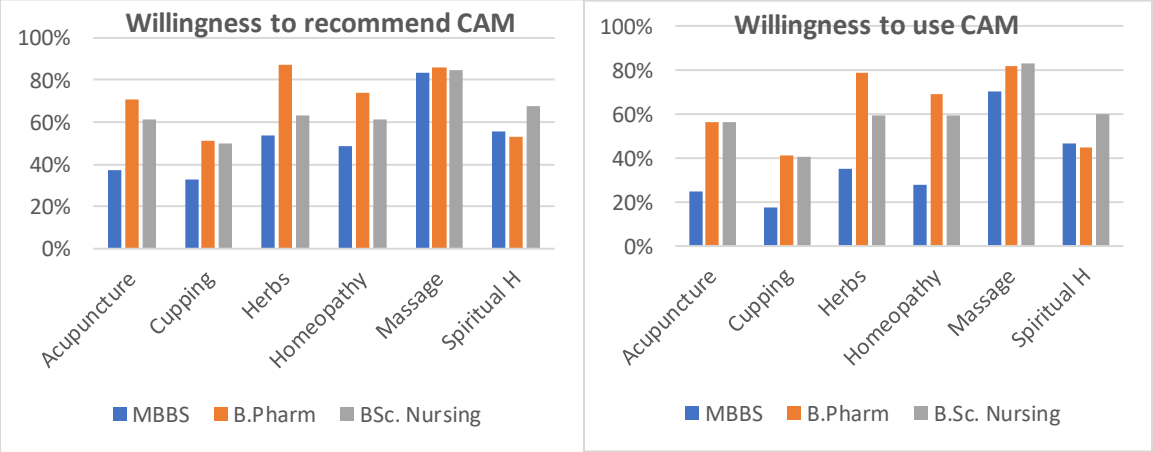
S/no.	Statement	Score over 5		
		MBBS	Pharm	Nursing
1	All practitioners of CAM should be medically qualified	3.22	3.44	3.31
2	I believe in alternative approaches in health area	3.29*	3.71*	3.62
3	Treating a condition using CAM is safer than using modern methods	1.63£,&	2.27£	2.16&
4	You need to be "gifted" to carry out CAM	1.32$	1.70<,$	1.37<
5	CAM has low status within medicine	2.54	2.40	2.28
6	CAM is only effective in treating minor complaints.	2.09	1.95	2.17
7	CAM is fairly unscientific.	3.43	3.5	3.43
8	Patients on CAM hardly ever get better	1.66	1.53	1.80
9	CAM should be taught in medical school.	3.08^	3.6^	3.30
10	CAM is more cost-effective than modern medicine	2.64	2.97	3.03
11	A doctor should know CAM methods	3.23	3.3	3.38
12	Herbal medicine is unsafe and ineffective	2.12%	1.21%,?	1.87?
13	Providing information about herbal medicine is part of a doctor/pharmacist's professional responsibility.	3.04+	3.54+,=	3.13=
14	It is important to consult a health professional before using CAM.	3.99	3.83	3.77

Super scripts implies significance difference ($p<0.05$). N=300

Participants' Willingness to Use or Recommend CAM

The result obtained from this study show that the willingness to recommend or use CAM varied among the participants. Pharmacy students showed high willingness to recommend or use acupuncture (71%), herbs (87%), and homeopathy (74%), followed by nursing students with 61%, 63%, and 61% and then medicine students with 37%, 54%, and 48% for acupuncture, herbs, and homeopathy respectively (Figure 2). Nursing students had high willingness to recommend or use spiritual healing (67%) as compared to pharmacy (53%) and medicine (56%) (Figure 2). The willingness to recommend or use massage is high among all participants group (more than 65%) but reverse is the case for cupping (with < 40%). This outcome indicates that, although the medicine students have good knowledge and positive attitude towards CAM they still had the least willingness to recommend or use CAM.

Figure 2: Willingness to recommend use CAM



Correlation of Participants' Knowledge, Perception, Attitude, and Willingness

Correlation analysis (Pearson's correlation) was conducted to determine the relationship between the variables: knowledge, perception, attitude and willingness. The correlation analysis generated coefficient values (*r*) which ranges from 1 to -1. A positive value indicates positive relationship while a negative value indicates negative relationship. Results obtained in this study revealed a positive correlation of participants' knowledge, perception, attitude, and willingness towards CAM. For example with respect to medicine students a weak correlation exist between their knowledge and perception (r = 0.240 at p = 0.018), their knowledge and willingness (r = 0.246 at p = 0.015), their perception and attitude (r = 0.215 at p = 0.034), their perception and willingness (r = 0.560 at p = 0.000), and between their attitude and willingness (r = 0.317 p = 0.002) (Table 5).

Table 5: Correlations of participants' knowledge, perception, attitude, and willingness

			Knowledge	Perception	Attitude	Willingness
Medicine	Knowledge	*R*	1	.240*	-.042	.246*
		P		.018	.681	.015
	Perception	*R*	.240*	1	.215*	.560**
		P	.018		.034	.000
	Attitude	*R*	-.042	.215*	1	.317**
		P	.681	.034		.002
	Willingness	*R*	.246*	.560**	.317**	1
		P	.015	.000	.002	
Pharmacy	Knowledge	*R*	1	.438**	.336**	.218*
		P		.000	.001	.029
	Perception	*R*	.438**	1	.308**	.548**
		P	.000		.002	.000
	Attitude	*R*	.336**	.308**	1	.169
		P	.001	.002		.093
	Willingness	*R*	.218*	.548**	.169	1
		P	.029	.000	.093	
Nursing	Knowledge	*R*	1	.156	.174	.174
		P		.124	.087	.086
	Perception	*R*	.156	1	.230*	.738**
		P	.124		.022	.000
	Attitude	*R*	.174	.230*	1	.266**
		P	.087	.022		.008
	Willingness	*R*	.174	.738**	.266**	1
		P	.086	.000	.008	

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

DISCUSSION

Complementary and alternative medicine has reverted back from ancient civilizations to the modern era. As of today, more than 80% of the developing world's population still depends upon CAM while half in the developed world use CAM (Bordeker and Kronenberg, 2002). Nevertheless, the nature and use of CAM may vary in different regions depending upon local culture and environment (Raza *et. al.,* 2018). The data from the present study have indicated that all the participants (medicine, pharmacy and nursing students) had good knowledge with positive perception and attitude towards CAM, albeit some had weak knowledge about

commonly used CAM modalities. This study highlighted that herbs, massage, and spiritual healing were the most commonly known modalities amongst students in all groups, a finding that is similar to previous report that reported herbal medicine, massage, and spiritual healing are the most commonly known CAM practices amongst students (Gelaw *et. al*., 2014). Other studies supporting this view have been reported from Kuwait (Awad *et. al.*, 2012), Ghana (Ameade, 2016), Syria (James and Bah, 2014), and Czech Republic (Pokladnikova, 2008). These data suggested that CAM modalities, herbs massage and spiritual healing are well acquainted CAM modalities among students of Arab, European, African and Asian origin and are frequently practiced as well. Moreover, frequent interaction of pharmacy students compared to medicine and nursing students with medicinal plants during their studies might be the reason for their better knowledge of herbs.

Conversely, aromatherapy, ayurveda, chiropractic and oriental medicine remained the least known modalities amongst the students, a trend that is consistent with the findings of a study from Singapore (Yeo *et. al*., 2005). The data obtained in this study show that medical students were unfamiliar with aromatherapy, ayurveda, chiropractic therapy and oriental medicine. This could be due to Chinese and western origin of these modalities as the modalities were never or rarely discussed among family members, friends, and health providers and almost non-existent or a very few of the modalities practitioners.

Several lines of literature evidence have suggested that students exhibited positive attitudes and beliefs towards CAM usage (Kanadiya *et. al*., 2012; Al Mansour *et. al.*, 2015; Jamshed *et. al*., 2016). The findings from the present study and those reported previously suggest that students gained much of their information about CAM from non-scientific sources. Nonetheless, all the participants, pharmacy, medicine and nursing students favored the inclusion of CAM in formal degree programs, such as pharmacy and medicine. This highlights the need to revise the academic curricula and health policies to regulate and standardize health care practices of CAM to ensure public protection. Furthermore, our findings also suggested that the students believed CAM possess ideas and methods from which conventional medicine could benefit, thus CAM should be made more scientific and taught in medical schools. A doctor should know CAM methods, provide information about herbal medicine and should be consulted before using CAM. This finding is in line with previous studies by Kreitzer *et. al*., (2002) and Yeo *et. al*., (2005) and could imply that our students as future practitioners believed that CAM has important role in health care. Many literature reports suggested that pharmacy students supported the inclusion of CAM in their curriculum to better guide and practice CAM in rendering professional health services (Hussain *et al*, 2012; James and Bah, 2014; James *et al*, 2016).

Additionally, all the participants (pharmacy, medicine and nursing) strongly believed that patient's expectations, health beliefs and values should be integrated into patient care processes. This finding is in line with previous study report amongst pharmacy and non-pharmacy students in Pakistan (Mariam *et al*, 2019). Also, in the present study, the most perceived barrier to using CAM was present of quack practitioners and lack of scientific evidence. This is also in consistent with previous study report in Kuwait (Awad *et al*, 2012). Therefore evidence-based training is required in the use of CAM and also the integration of CAM education in the existing curriculum to enable the future practitioners to provide better patient management.

This study also revealed a wide variation between 'personal use of CAM' and 'CAM recommendation'. In contrast to a study by Maha and Shaw (2007) which reported that most healthcare professionals who use CAM personally, do not recommend it, participants in

current study showed more willingness to recommend CAM than use it. Another study by Clement *et al*, (2005) also found that out of 40.6% of physicians that used herbs only 27.1% recommended them to their patients. Differentially, in this study, medicine students were found to be more reluctant to recommend/use CAM, this could be due to ethical and legal obligations to patients *vis-à-vis* insufficient knowledge and evidence to justify CAM recommendation. Conversely, more willingness to recommend/use CAM by pharmacy students was observed in this study. The perceived safety and its feature as a natural product by pharmacy students may contribute to their willingness to recommend/use CAM.

CONCLUSION

The results obtained in this study have shown that there is good knowledge and awareness of CAM amongst the participants, but their perception, attitude and willingness differed. There was also a positive correlation of participants' knowledge and their perception, attitude and 'willingness to use' towards CAM. Thus, there is also need for government of Nigeria to review its policy to integrate traditional medicine practices in medical school curriculum in other to increase the knowledge of CAM amongst students and also to help improve their perception and attitude towards CAM.

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