KNOWLEDGE, ATTITUDE AND PRACTICE OF NIGERIAN MEDICAL STUDENTS TOWARDS COMPLEMENTARY AND ALTERNATIVE MEDICINE IN COVID-19 MANAGEMENT

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ABSTRACT

Background: **Complementary and alternative medicine (CAM) is commonly used, but many physicians have limited knowledge of CAM despite its widespread use. Therefore, this study sought to assess the knowledge, attitude, and practice of medical students on complementary and alternative medicine in the management of COVID-19.**

Methods: **A descriptive cross-sectional study was conducted among 150 medical students from three Federal Universities in South West, Nigeria. A self-administered semi-structured online Google Forms questionnaire was used to collect information. Chi-squared and Fisher's exact test was used to analyze the bivariate relationship between KAP status and sociodemographic characteristics. Spearman's correlation coefficient matrix was computed to determine the association between knowledge, attitude, CAM, age, and religiosity practice.**

Results: **The median age was 22 years (interquartile range: [IQR]: 21-23 years). Median self-rated score for religion was 4.00 (IQR: 3.00-4.25). Median knowledge score was 4.00 (IQR: 3.75-5.00), median attitude score 2.75 (IQR: 2.38-3.00) and median practice score 2.00 (IQR: 1.00-2.00). Thirty-seven respondents (24.7%) were considered to have poor knowledge about CAM use in COVID-19 while the rest (75.3%) had good knowledge. Thirty-eight (25.3%) had a poor attitude towards using CAM in COVID-19 and 112 (74.7%) had a good attitude.**

Conclusion: **Medical students have good knowledge and a positive attitude towards CAM modalities as adjunct management for COVID-19. However, their practices do not reflect wide acceptability. There is a need for clinical trials on the efficacy of CAM as an adjunct treatment for COVID-19 to further inform its use.**

Keywords: Knowledge, Attitude, Practice, COVID-19, Medical students, Nigeria

INTRODUCTION

The novel Coronavirus disease-19(COVID-19) pandemic is unprecedented in several ways and posed a significant challenge to the global healthcare system and practices.[1] The discovery of the zoonotic infection Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2) popularly called COVID-19 was the sequel to the cases confirmed by the seafood market Wuhan city of Hubei Province in China in December 2019.[2] On March 11 2020, the World Health Organization (WHO) declared COVID-19 a pandemic[3]. Nigeria confirmed its first case on February 27 2020, and by December 28 2020, the disease was confirmed in 84,811 people countrywide.[4] Globally, there is no definitive treatment for COVID-19, but prompt supportive management is useful, it is essential to be abreast of the various supportive treatments for COVID-19 patients. Health care can be modern (conventional, orthodox, western, mainstream, allopathic) or traditional (indigenous, non-mainstream, complementary, alternative or integrative).

The National Center for Complementary and Alternative Medicine (NCCAM) has defined Complementary and Alternative Medicine (CAM) as a group of medical and health care systems, practices and products that are not currently part of conventional medicine.[5] When unconventional approach and products are also used with conventional medicine, it is termed complementary; but it becomes an alternative medicine when used in place of conventional medicine. Therefore, CAM is a general term used for both complementary and alternative health care practices[5].

CAM includes various approaches outside the conventional western medicine used to prevent and treat illnesses/diseases and promote health[6]. The definition of what constitutes CAM, however, is culturally dependent[7]. Several studies have assessed the validity and importance of holistic patients care health using CAM[7,8]. In a narrative review conducted by Kok *et al.,* it was concluded that CAM prevention and treatment strategies could lead to the prescription and consumption of fewer antibiotics by improving patients' immunity without drugs. Some have been shown to have promising treatment strategies for respiratory infections[9].

The coronavirus disease (COVID-19) pandemic is the most global pandemics in terms of its coverage and has challenged the health care systems. In a study conducted by Tillu *et al.,* on the public health approach of CAM for COVID-19 prophylaxis, it was observed that improving patient's immunity is a great tool in preventing and managing the disease[10]. Since the onset of the novel coronavirus (COVID-19) pandemic, there has been much information sharing on social media about using CAM treatment to fortify human immunity for supportive therapy against COVID-19 infection[11]. Commonly used CAM therapies include natural, biological plant-based products such as honey, lemon, lime ginger, garlic and herbal teas. There is evidence that nutritional supplements and herbal preparations present in CAM products help boost immunity and protect from infections[11]. In a multicenter study conducted in Nigeria on herbal medicine among pregnant women, it was reported that among the various reasons why patients take herbal medicine includes the belief of higher efficacy and broader disease coverage, sociocultural belief and tradition, relatively low cost of the herbal products and sometimes increased availability[12]. In recognition of the widespread popularity of CAM, many academic institutions worldwide are increasingly incorporating CAM into medical education, clinical practice, and research[13, 14]. A descriptive survey conducted at Lagos University Teaching Hospital among resident doctors showed that 60.0% had a positive attitude towards herbal medicine. However, 40.7% reported that they would not encourage their patients to use such[15]. Therefore, this study was carried out to assess the knowledge, attitude, and perception of medical students about complementary and alternative medicine in the management of COVID-19.

METHODOLOGY

Study Area

This study was carried out among medical students in year four to six selected from the three Federal Universities in South West, Nigeria. These include University of Ibadan, Ibadan, Oyo State; Obafemi Awolowo University, Ile-Ife, Osun State; and University of Lagos, Lagos State. Federal Universities have a catchment area of all States of the Federation; hence, the students are representatives of the Nigerian population.

Study Design

This was a descriptive cross-sectional study.

Sampling Method

The study participants were recruited via convenience sampling using a snowballing method on social media platforms to share the online survey link.

Inclusion Criteria and Exclusion Criteria

The study participants were male and female clinical students in fourth, fifth and sixth year in the selected medical schools. Medical Students in the pre-clinical stage of training were excluded from the study.

Sampling

The 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. However, only 150 respondents (40.6% response rate) completed the online survey over eight weeks of data collection (August 27- September 27, 2020).

Data Collection

Eligible medical students were recruited via the WhatsApp social media platforms of their institutions through their class representatives, and the survey forms were sent to eligible students via personal WhatsApp. Data was collected with the aid of a self-administered semi-structured online google link questionnaire developed by the researchers. The survey instrument was developed after an extensive literature search and reviewed by a group of physicians and medical students. The questionnaire was then pretested among 20 Clinical Medical students of Ladoke Akintola University, Osogbo, Osun State, Nigeria and necessary adjustments made before data collection. The questionnaire consisted of four sections: sociodemographic characteristics, knowledge of complementary and alternative medicine (CAM) in the management of COVID-19, the attitude of respondents to CAM in COVID-19, and practice of respondents as regards CAM in COVID-19.

Data Analysis

Data from the completed survey were entered into statistical package SPSS version 23. Knowledge,

attitude and practice scores were calculated for each respondent. For the knowledge questions, correct responses were scored one or otherwise scored zero. The maximum knowledge score was five. Questions on attitude were scored on a Likert scale from zero to four. The attitude score was obtained by dividing the total points by eight, while practice was scored all over six. Participants with knowledge scores e"four were considered to have good knowledge. Those with attitude scores ≥2.41 were considered to have a positive attitude, while practice scores ≥three were rated good.

Frequencies and proportions were calculated for the categorical variables. Chi-square and Fisher's exact test is used to analyze the bivariate relationship between KAP status and sociodemographic characteristics. The median and interquartile range were computed for the age, knowledge, attitude and practice scores. Spearman's correlation coefficient matrix was computed for the knowledge, attitude and practice scores to determine the strength of association between the knowledge, attitude, the practice of CAM, age and religiosity. *P*-value < 0.05 were considered significant in the analyses.

Ethical considerations: Ethical approval was obtained from the UI/UCH Institution Review Board (Approval number: UI/EC/20/0353). The online questionnaire included a detailed explanation of the study's purpose, and consent was obtained from the participants before completing the survey.

RESULTS

Sociodemographic Characteristics

A total of 150 respondents completed the survey. The sociodemographic characteristics of the respondents are presented in Table 1. There were more female (58.0%) than male respondents (41.3%). The median age was 22 years (interquartile range: [IQR]: 21-23 years). Almost half (49.3%) of the respondents were fifth-year Medical Students, while fourth and sixth-year students constituted 37.3% and 13.3% of the study population, respectively. Majority (86.6%) of the respondents were Christians, and the median self-rated score for religion was 4.00 (IQR: 3.00-4.25).

Table 1: Sociodemographic characteristics of respondents

Year of study	Frequency (%)
4th	56 (37.3)
5th	74 (49.3)
6th	20 (13.3)
Gender	
Female	87 (58.0)
Male	62 (41.3)
Non-binary	1 (0.7)
Religion	
Christianity	129 (86.0)
Islam	17 (11.3)
Not religious	4 (2.7)
How religious do you consider yourself?	
0	10 (6.7)
1	6 (4.0)
2	14 (9.3)
3	28 (18.7)
4	55 (36.7)
5	37 (24.7)
University Attending	
University of Lagos, Lagos	36 (24.0)
Obafemi Awolowo University, Ife, Osun	48 (32.0)
University of Ibadan, Ibadan, Oyo	66 (44.0)

Knowledge, Attitude and Practices associated with the use of CAM in COVID-19

Tables 2, 3 and 4 show the respondents' responses to questions and statements on their knowledge, attitudes and practices concerning Complementary and Alternative Medicines (CAMs) and their use in COVID-19.

None of the respondents disagreed with the statement that a patient's treatment should be all-encompassing (physical, mental and spiritual). Only 1.3% disagreed that patients' spiritual beliefs could play an important role in their recovery. The majority (77.3%) of respondents would love to learn more about CAMs and their use to prevent and treat COVID-19.

Only 11% use herbal supplements as an immune booster to prevent COVID-19 infection or as an alternative to conventional medicine. Majority (81.3%) of the participants would recommend yoga, meditation or prayers for mental health reasons. A larger proportion of them (90.7%) also share information to educate others on the use of CAM. Fifty-five (36.7%) participants regularly consume at least one CAM supplement to protect against COVID-19. Figure 1 shows the number of respondents that consume each supplement.

Median knowledge score was 4.00 (IQR: 3.75-5.00), median attitude score 2.75 (IQR: 2.38-3.00) and median practice score 2.00 (IQR: 1.00-2.00). Thirty-seven respondents (24.7%) were considered to have poor knowledge about CAM use in COVID-19 while the rest (75.3%) had good knowledge. Thirty-eight (25.3%) had a poor attitude towards using CAM in COVID-19 and 112 (74.7) had a good attitude.

Table 2: Respondents' knowledge on the use of CAM in COVID-19

Knowledge	Yes (%)	No (%)	I do not know (%)
Herbal Supplement is a recognized group of Complementary and Alternative Medicines	121 (80.7)	11 (7.3)	18 (12.0)
The World Health Organization has approved the use of herbal supplements in the treatment of COVID-19	5 (3.3)	114 (76.0)	31 (20.7)
Gargling or drinking hot water inactivates SARS-CoV-2 viral particles and prevents COVID-19 infection	10 (6.7)	123 (82.0)	17 (11.3)
High intakes of fruits and vegetables are beneficial to boost my immune status	147 (98.0)	2 (1.3)	1 (0.7)
Evidence supports the fact that CAMs are generally more effective and safer than conventional medicine	3 (2.0)	105 (70.0)	42 (28.0)

Table 3: Respondents' attitude towards CAM and their use in preventing and managing COVID-19

Attitude	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
A patient's treatment should take into consideration all aspects of his or her physical, mental and spiritual health	0 (0.0)	0 (0.0)	7 (4.7)	19 (12.7)	124 (82.7)
The focus of a primary care physician should be on promoting health rather than treating disease.	6 (4.0)	10 (6.7)	19 (12.7)	36 (24.0)	79 (52.7)
Patients whose doctors know about complementary and alternative medicine, in addition to conventional medicine, benefit more than those whose doctors are only familiar with conventional medicine.	9 (6.0)	14 (9.3)	48 (32.0)	42 (28.0)	37 (24.7)
The spiritual beliefs of patients play an important role in their recovery.	0 (0.0)	2 (1.3)	19 (12.7)	44 (29.3)	85 (56.7)
A system of medicine that integrates therapies of both conventional medicine and complementary and alternative medicine would be more effective than either conventional medicine or complementary and alternative medicine provided independently.	5 (3.3)	12 (8.0)	35 (23.3)	45 (30.0)	53 (35.3)
Conventional medical practitioners should be very critical of CAMs in the management of COVID-19.	10 (6.7)	23 (15.3)	53 (35.3)	35 (23.3)	29 (19.3)
I know all that is to be known on CAM use as regards COVID-19 pandemic	52 (34.7)	59 (39.3)	32 (21.3)	6 (4.0)	1 (0.7)
I am willing to learn more about CAMs and their use in preventing and treating COVID-19.	0 (0.0)	5 (3.3)	23 (15.3)	56 (37.3)	66 (44.0)

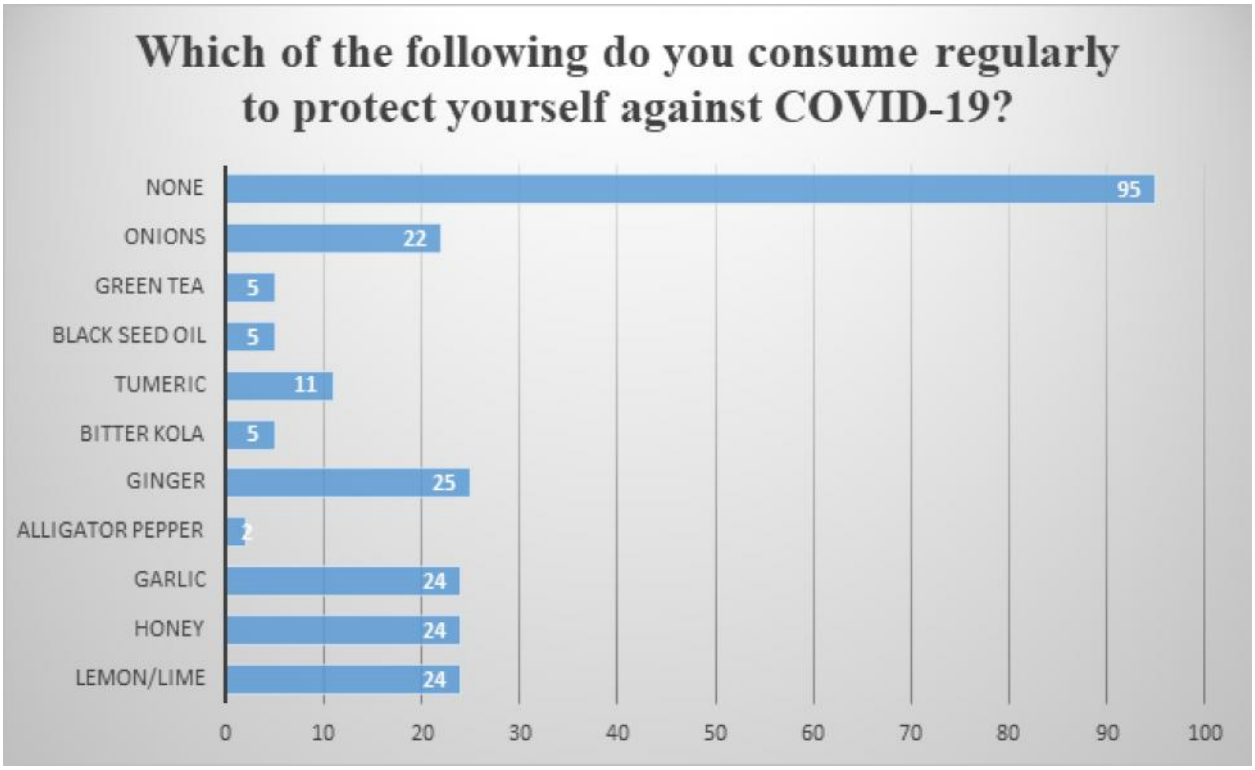

Figure 1: CAMs regularly consumed by respondents to protect against COVID-19

Regarding whether students were putting into practice the use of CAM in COVID-19, only 34 (22.7%) were considered putting it into practice.

Association between Knowledge, Attitude and Practices and Sociodemographic Characteristics
Bivariate analysis of the relationship (Table 5) between knowledge, attitude and practice (KAP) status and sociodemographic reveals that the practical application of CAM was significantly associated with the year of study. Our findings also reveal significant association ($p = 0.001$) between practising CAM and the University the respondent is attending. Moreover, the correlation matrix (Table 6) reveals no association between respondents' self-rated score of how religious they are and KAP status. Age and KAP status were also not significantly correlated. Attitude and practice were weakly correlated ($\varrho = 0.333$, $p < 0.001$), whereas the negative correlation between knowledge and practice was even weaker ($\varrho = -0.214$, $p < 0.001$).

Table 4: Practices associated with the use of CAM for preventing or managing COVID-19

Practice	Yes (%)	No (%)
I use herbal supplements to improve my immunity and help prevent COVID-19 infection.	17 (11.3)	133 (88.7
I usually use herbs as an alternative to prescribed Conventional Medicine.	17 (11.3)	133 (88.7
I recommend yoga, meditation or prayers to help cope with the psychological effects of the lockdown due to the pandemic	122 (81.3)	28 (18.7)
I share information [via social media or face-to-face interaction] to educate others on the use of CAM to prevent and support the treatment of COVID-19 infection.	136 (90.7)	14 (9.3)
I recommend herbal supplements during the COVID-19 pandemic to improve immune functioning	39 (26.0)	111 (74.0
I regularly consume at least one herbal supplement to protect against COVID-19	55 (36.7)	95 (63.3)

Table 5: Association between knowledge, attitude and practice and sociodemographic characteristics

	Knowledge				Attitude				Practice			
	Poor	Good	Chi-squared (χ^2)	p-value	Poor	Good	Chi-squared (χ^2)	p-value	Poor	Good	Chi-squared (χ^2)	p-value
Year of study			**0.374**	**0.829**			**0.794**	**0.672**			**6.479**	**0.039***
4th	15 (26.8)	41 (73.2)			12 (21.4)	44 (78.6)			37 (66.1)	19 (33.9)		
5th	18 (24.3)	56 (75.7)			20 (27.0)	54 (73.0)			62 (83.8)	12 (16.2)		
6th	4 (20.0)	16 (80.0)			6 (30.0)	14 (70.0)			17 (85.0)	3 (15.0)		
Gender			**3.942[a]**	**0.122**			**2.500[a]**	**0.390**			**3.326[a]**	**0.182**
Female	24 (27.6)	63 (72.4)			26 (29.9)	61 (70.1)			66 (75.9)	21 (24.1)		
Male	12 (19.4)	50 (80.6)			12 (19.4)	50 (80.6)			50 (80.6)	12 (19.4)		
Non-binary	1 (100.0)	0 (0.0)			0 (0.0)	1 (100.0)			0 (0.0)	1 (100.0)		
Religion			**0.564[a]**	**0.814**			**4.865[a]**	**0.083**			**3.245[a]**	**0.170**
Christianity	33 (25.6)	96 (74.4)			32 (24.8)	97 (75.2)			97 (75.2)	32 (24.8)		
Islam	3 (17.6)	14 (82.4)			3 (17.6)	14 (82.4)			16 (94.1)	1 (5.9)		
Not religious	1 (25.0)	3 (75.0)			3 (75.0)	1 (25.0)			3 (75.0)	1 (25.0)		
University Attending			**0.949**	**0.622**			**1.750**	**0.417**			**14.182**	**0.001****
University of Lagos, Lagos	9 (25.0)	27 (75.0)			11 (30.6)	25 (69.4)			34 (94.4)	2 (5.6)		
Obafemi Awolowo University, Ife, Osun	14 (29.2)	34 (70.8)			9 (18.8)	39 (81.3)			29 (60.4)	19 (39.6)		
University of Ibadan, Oyo State	14 (21.2)	52 (78.8)			18 (27.3)	48 (72.7)			53 (80.3)	13 (19.7)		

[a] *Fisher's exact test*
**p < 0.05*
***p < 0.01*

Table 6: Correlation matrix showing the strength of association between knowledge, attitude, practice and sociodemographic factors

		Age	How religious do you consider yourself?	Knowledge	Attitude	Practice
Age	Correlation Coefficient (ϱ)	1.000	0.083	-0.025	0.042	-0.104
	p-value	.	0.311	0.765	0.614	0.207
How religious do you consider yourself?	Correlation Coefficient (ϱ)		1.000	-0.056	0.116	0.007
	p-value		.	0.494	0.157	0.929
Knowledge	Correlation Coefficient (ϱ)			1.000	-0.126	-0.214**
	p-value				0.125	0.008
Attitude	Correlation Coefficient (ϱ)				1.000	0.333**
	p-value					0.000
Practice	Correlation Coefficient (ϱ)					1.000
	p-value					.

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

DISCUSSION

Despite the paucity of scientific evidence backing most Complementary and Alternative Medicine (CAM) modalities, CAMs are quite popular globally. The CAM market, with an annual growth rate of 5-15%, is expected to be worth US$5 trillion by 2050[16,17]. Therefore, it is expedient for medical practitioners of the future to know about CAM and develop a right attitude to its use in light of the available evidence. The COVID-19 pandemic that has no known cure yet even brings this matter to the fore.

Majority of respondents were aware of herbal supplements as a category of CAMs. There was also a heightened awareness of fruits and vegetables as an important immune booster. Fruits and vegetables are sources of micronutrients such as Vitamin C, Vitamin D and Zinc, which can help the immune system combat infections[17, 18]. Majority of respondents subscribed to holistic medical care in which every aspect of the patient's health is considered. The proportion of participants with a good attitude towards CAM is comparable to a previous study among medical students in Ghana, a West African country like Nigeria (77% vs 75%) [19]. Complementary and alternative medicine (CAM) is widely used in the general population, but many patients do not disclose the use of CAM to their healthcare workers[8, 20]. It is essential for medical students who are sooner going to be the frontiers of the healthcare system in Nigeria to be knowledgeable on CAM, particularly during this COVID-19 pandemic.

A few participants practised CAM in their personal lives. There also appeared to be a negative correlation between practice and knowledge. This could be because of the paucity of evidence as regards the efficacy of CAMs in COVID-19. Medical students are trained using evidence-based medicine and global best practices. Hence their practices are guided by evidence. To date, no integrative measure has been validated in human trials as effective specifically for COVID-19[21]. However, some indirect evidence suggests that Traditional Complementary and Alternative medicine (TCM) may have a potential role in the treatment of COVID-19[22]. There are an overall positive attitude and a positive correlation with knowledge, thus implying that medical students are indeed hopeful for future advancements in CAM and potential for relevance in the treatment of COVID-19. It was observed that students' religion and religiosity played no role in their KAP knowledge, attitude and practice status. Age, gender and year of study were also non-significant in their relationship with students' KAP. The statistically significant differences in KAP status across the three schools considered in this study could have been due to differences in the respondents' medical school curriculums and clinical exposure. Emphasizing the Federal Government's need to ensure Federal Universities adopt standardized curriculums in different institutions across the country**.** Despite an overall low practice score, most participants share educational materials on the use of CAM in COVID-19, and a significant proportion of respondents recommend certain CAM modalities to cope with mental health adverse effects that come with the pandemic. This has been similarly observed in a systematic review of 21 cross-sectional studies among nurses, which found that the primary reason nurses suggested CAM were to help patients cope with stress and anxiety[23].

The World Health Organization (WHO) recognizes that traditional, complementary and alternative medicine has many benefits and Medicinal plants such as Artemisia annua are being considered as possible treatments for COVID-19[24]. Nevertheless, there is a need to establish safety and efficacy through randomized clinical trials. COVID Organics from Madagascar is one of the popular herbal therapies for COVID-19 developed in Africa[25]. However, WHO is yet to approve its use, as it has not gone through clinical trials, which is statutory in drug development. In countries like India and China, government agencies have significant advocacies for the use of CAMs as supportive therapies for the management of COVID-19[25]. CAM therapies accounted for 75% of registered clinical trials in India's Clinical Trial Registry (CTRI) as of June 19, 2020. This prevalence was 26.8% in the Chinese Clinical Trial Register while the European Union (EU) Clinical Register and Clinicaltrials.Gov were 0.87% and 1.77%, respectively[26]. A later survey of the CTRI as of July 11, 2020, reported that 61% of the trials were CAM-related[27]. This observation reflects the prevailing socio-cultural and political landscapes in countries such as China and India, where the government approves of CAMs in the management of COVID-19[25]. Several herbal extracts and spices, which are touted as therapeutic options against infections, are consumed regularly in Indian diets. Curcumin, a turmeric extract (present in Indian staple foods) shown to have antiviral and immunomodulatory effects is exemplary in this regard[17, 28]. A systematic review by Liu *et al.* 2020 claimed that synergy of traditional Chinese medicine and conventional medical practice improved COVID-19 cure.[29] Notwithstanding, for CAMs to become more mainstream in conventional clinical practice, they have to be subjected to the same scientific rigour processes as the other therapies developed in conventional medicine. Hence, there is a need for clinically and statistically significant results from large trials.

The small sample size used in this study would limit the generalizability of our findings. We propose that future studies investigate the discrepancies in students' knowledge and attitude towards CAM and their practices in using them against COVID-19 infection.

LIMITATION

Though the study was conducted in three Federal Medical Colleges, the result cannot be generalized due to the small sample size. The poor response rate to the online survey was a major limitation.

CONCLUSION

In conclusion, our study shows that medical students have good knowledge and a positive attitude towards CAM modalities as management options for COVID-19. However, their practices do not reflect wide acceptability for the use of CAMs on COVID-19. We posit that the students are open to more evidence regarding the use of CAMs in COVID-19 and would adopt the modalities in the light of new evidence.

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