



Academic education in health profession programs, knowledge and use of Complementary and Alternative Medicine (CAM) by university students

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ABSTRACT

Objectives: To assess the association of academic education in health professions programs with the knowledge and use of Complementary and Alternative Medicine (CAM) by university students and to determine whether CAM can promote a healthy university environment.

Methods: A cross-sectional study was carried out with 512 university students enrolled in health professions programs in the city of Fortaleza, Ceará, Brazil, from April to November 2017. The Assessment Tool for Health Promotion at the University was used to collect sociodemographic, academic and CAM data. Bivariate and multivariate analyses were performed considering the outcomes “knowledge of CAM” and “CAM in the promotion of a healthy university environment” using SPSS Statistic version 20.0.

Results: Data from 512 participants were analyzed. Women (n = 357; 69.7%), young students (n = 393; 76.8%) and unemployed students (n = 429; 83.8%) predominated. Knowledge of CAM was associated with health profession program (OR = 0.934; p = 0.047), paternal education (OR = 0.641; p = 0.024), employment (OR = 0.542; p = 0.028) and participation in extracurricular activities (OR = 1.275; p = 0.007). There was a proportional difference between knowledge and use of CAM ranging from 2:1 to 11:1 among the 21 modalities. University students believed that CAM could promote a healthy university environment (p = 0.000), which was influenced by gender (OR = 2.089; p = 0.004) and knowledge of CAM (OR = 16.601; p = 0.000).

Conclusions: University students’ knowledge of CAM was influenced by the health profession program, paternal education, employment and participation in extracurricular activities. The percentage of use of CAM modalities was lower than the percentage of knowledge. University students’ belief that CAM could foster a healthy university environment is influenced by gender and knowledge of CAM.

1. Introduction

Technological and scientific advancements in the hegemonic biomedical model of health care have contributed to reduce morbidity and mortality in the world population by improving the affected organ system and treating disease signs and symptoms.¹ However, Complementary and Alternative Medicine (CAM) modalities are still widely used in Eastern and Western nations, both because of lack of access to conventional treatment and because of the attempt to deliver a more holistic care depending on the socioeconomic and cultural reality of each country in the five continents.²

CAM, a set of knowledges and practices that are not generally considered part of conventional medicine, aims at restoring the well-being and the dynamic and emotional balance of the population by considering the person’s physical, mental and spiritual needs in a holistic way. It also differs from traditional medicine, which is based on indigenous culture and explainable and non-explainable beliefs used to maintain health.¹ Given that, interest in CAM has grown much.^{3,1} Worldwide, more than 69 member-states of the World Health Organization (WHO) have institutionalized many policies to regulate products, practices and professionals that use such modalities.¹

CAM is a billion-dollar growing health industry in many countries

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around the world.⁴ Such growth has been related to health and quality of life improvement, recovery and/or cure of diseases, perception of fewer side effects, and lower costs and immediate care when compared to conventional medicine.⁵ In Brazil, CAM was regulated in 2006 by the National Policy on Integrative and Complementary Practices.⁶ In 2017, 1.4 million consultations were performed by the Brazilian public health system, which currently has 29 different modalities.⁷

The regulation of CAM contributes to its recognition and integration into existing health services. Within this context, health professionals and students must be prepared to meet a growing demand of patients' use of CAM. Thus, addressing this topic during academic training is important to ensure patient safety and the quality and efficacy of these practices.⁸

In Brazil, academic education in health care programs has privileged the biomedical model of health care as a pillar of health care to the detriment of other therapeutic options, such as CAM practices, which have not been taught in these programs.⁹ Therefore, higher education institutions need to include alternative therapeutic modalities in their curricula.¹⁰ Studies carried out with Medical,¹¹ Pharmacy,¹² Dental,¹³ and Nursing¹⁴ students from Western and Eastern countries have shown that the knowledge and use of CAM can be enhanced through teaching, research and extension programs at universities.

In addition, the use of CAM in the university environment can produce physical and mental health benefits and have an impact on the quality of life of students, professors, employees and community. Therefore, it can be used as an instrument for health promotion in educational settings.¹

This study aimed to assess the association of academic education in health care programs with the knowledge and use of Complementary and Alternative Medicine (CAM) by university students and to determine whether CAM can promote a healthy university environment.

2. Methods

2.1. Study design

This is a quantitative analytical cross-sectional study carried out at the University of Fortaleza (*Universidade de Fortaleza - UNIFOR*) in the state of Ceará, Northeastern Brazil. This study is part of a research project titled "Health promotion in the young population: what is the role of university?", which was carried out between April and November 2017.

2.2. Study population

The study population consisted of undergraduate university students aged 18 years and above, regardless of sex, enrolled in one of the nine health professions programs. Pregnant women and individuals with visual or physical disabilities were excluded from the study due to the peculiarities of the instruments used.

Participants were 544 undergraduate students estimated according to the following criteria: population of 7000 health professions students in the selected institution, prevalence rate of 50% (because there is no knowledge of the real prevalence rate), 95% confidence interval, maximum error of 5%, and non-response rate of 20%. Of these, 32 were withdrawn due to inconsistency and errors in the collection of anthropometric data. Thus, the remaining 512 participants were symmetrically distributed by profession: 57 Physical Education students, 57 Nursing students, 58 Pharmacy students, 58 Physical Therapy students, 46 Speech Therapy students, 58 Medical students, 60 Nutrition students, 59 Dental students and 59 Psychology students.

The sample was stratified by undergraduate program. We carried out a survey of the subjects taught in the first, second, and last two academic semesters in different shifts and times in order to select the classes and directly invite students to participate in the research.

This study was approved by the research ethics committee of the University of Fortaleza (Approval No. 1.795.390). All the participants gave their written voluntary informed consent.

2.3. Data collection procedures and variables

Data were collected using the Assessment Tool for Health Promotion at the University (*Instrumento de Avaliação da Promoção da Saúde na Universidade - IAPSU*), a self-administered questionnaire targeted at university students that was validated by Brazilian researchers.¹⁵ This tool has 41 items organized in two sections. The first section consists of questions about demographic and socioeconomic characteristics and the second section consists of five domains: 1) physical activity, 2) diet, 3) environmental factors, 4) psychosocial factors and alcohol and drug use, and 5) Complementary and Alternative Medicine.

In this study, we analyzed sociodemographic variables (age, sex, self-reported race, religion/belief, employment status and paternal and maternal education), academic education (undergraduate program, semester of the program, participation in extracurricular activities), and the 5th domain related to CAM (21 modalities¹⁵ were listed and students answered yes/no questions about the knowledge and use of each modality). We also asked whether they believed CAM could promote a healthy university environment using a yes/no question.

To check for the presence of CAM in any subjects taught, we searched the official website of the institution to analyze the curricula of all the selected health courses. We searched for CAM in the names of subjects, syllabuses, program descriptions and references. After that, the health professions programs were classified into four categories according to the presence of CAM in the subjects taught: 1) basic training, 2) specific training, 3) basic and specific training, and 4) not included in the curriculum.

2.4. Data analysis

Descriptive and inferential statistics were used with the aid of SPSS Statistics (version 20.0). Qualitative variables were described as relative (%) and absolute (n) frequencies. Some variables were dichotomized for inferential analysis: categorized age (≤ 24 years and ≥ 25 years), categorized race (white and non-white), religion (catholic, non-catholic and no religion), paternal and maternal education in years of study (\leq eight years and $>$ eight years), semester (first year or last year) and extracurricular activities ("yes" for participation in at least one or "no").

In the bivariate analysis, the association between the dependent variables ("knowledge of CAM" and "CAM in the promotion of a healthy university environment") and independent variables (socio-demographic, academic and extracurricular activities variables) was determined using the chi-squared test followed by calculation of odds ratios (OR) and their respective confidence intervals (CI), with a significance level of 5%. After that, a logistic regression analysis was performed considering $p < 0.20$. The final model was built using the hierarchical selection of factors in each block. Adjusted OR and their respective confidence intervals (CI) were estimated.

3. Results

Of the 512 participants, 393 (76.8%) were aged 24 or less, 357 (69.7%) were women, 261 (51.0%) were White, 332 (64.8%) were Catholic, and 429 (83.8%) were unemployed. In addition, there were 205 (40.0%) participants whose fathers had a higher education degree and 259 (50.6%) participants whose mothers had a higher education degree. Details on demographics are displayed in [Table 1](#).

As displayed in [Table 2](#), knowledge of CAM was significantly associated with health professions programs ($p = 0.000$), especially Psychology ($p = 0.000$), Physical Therapy ($p = 0.000$), Physical Education ($p = 0.006$) and Nursing ($p = 0.020$) programs. Physical Therapy

Table 1
Distribution of university students' sociodemographic variables. Fortaleza, Ceará, 2017.

Variables	n	%
Age (years)		
Up to 24	393	76.8
25-30	79	15.4
31-35	23	4.5
36-49	17	3.3
Gender		
Women	357	69.7
Men	155	30.3
Self-reported race		
White	261	51.0
Mixed-race Brazilians	215	42.0
Yellow	18	3.5
Black	17	3.3
Indigenous	1	0.2
Religion (n = 511)		
Catholic	332	64.8
Protestant	63	12.3
Spiritist	18	3.5
Jew	1	0.2
Other	49	9.6
None	48	9.4
Employment		
No	429	83.8
Yes	83	16.2
Paternal education (n = 508)		
Higher education	205	40.0
Incomplete higher education	48	9.4
Secondary education	153	29.9
Incomplete secondary education	26	5.1
Primary education	19	3.7
Incomplete primary education	48	9.4
Uneducated	9	1.8
Maternal education (n = 511)		
Higher education	259	50.6
Incomplete higher education	39	7.6
Secondary education	129	25.2
Incomplete secondary education	23	4.5
Primary education	22	4.3
Incomplete primary education	36	7.0
Uneducated	3	0.6

Table 2
Association of Knowledge of Complementary Alternative and Medicine (CAM) and promotion of a healthy university environment with health professions programs. Fortaleza, Ceará, 2017.

Health profession program	Complementary Alternative and Medicine n (%)	Crude OR (95% IC)	p-value [#]
	Knowledge of CAM^a		
Physical Education	36 (63.2)	1.665 (1.134 – 2.445)	0.000*
Nursing	34 (59.6)	1.573 (1.062 – 2.328)	0.006*
Pharmacy	31 (53.4)	1.409 (0.037 – 2.118)	0.093
Physical Therapy	46 (79.3)	2.091 (1.467 – 2.980)	0.000*
Speech Therapy	22 (47.8)	1.261 (0.807 – 1.971)	0.310
Medicine	22 (37.9)	1	
Nutrition	30 (50.0)	0.759 (0.501 – 1.149)	0.187
Dentistry	24 (40.7)	0.932 (0.594 – 1.464)	0.761
Psychology	48 (81.4)	3.329 (1.883 – 5.885)	0.000*
	CAM in the promotion of a healthy university environment^a		
Physical Education	44 (78.6)	1.036 (0.848 – 1.264)	0.730
Nursing	50 (87.7)	1.156 (0.971 – 1.377)	0.010*
Pharmacy	49 (84.5)	1.114 (0.928 – 1.336)	0.244
Physical Therapy	56 (96.6)	1.273 (1.092 – 1.483)	0.001*
Speech Therapy	39 (84.8)	1.118 (0.924 – 1.351)	0.260
Medicine	44 (75.9)	1	
Nutrition	47 (83.9)	0.904 (0.751 – 1.088)	0.283
Dentistry	42 (72.4)	1.048 (0.845 – 1.299)	0.672
Psychology	46 (78.0)	0.973 (0.798 – 1.187)	0.787

CAM: Complementary Alternative and Medicine. OR: Odds Ratio. 95%IC: 95% Confidence Interval. ^aCompared with the health profession that exhibited the lowest percentage (Medicine) of knowledge. [#]Chi-squared, *p < 0.05.

(p = 0.001) and Nursing (p = 0.010) students believed that the use of CAM at the university could promote a healthy environment (Table 2).

The relationship between knowledge of CAM and academic semester was also analyzed. Final-year Physical Therapy (p = 0.010) and Nutrition (p = 0.039) students had greater knowledge of CAM compared with their first-year peers. However, there was a decrease in the percentage of final-year Psychology students who reported knowing CAM (p = 0.023) compared with their first-year peers. According to the university website, CAM was taught in basic and specific subjects included in the curriculum of the Physical Therapy program and in basic subjects included in the curriculum of the Nutrition program. CAM was not included in any of the subjects taught in the Psychology program (Table 3).

The CAM modalities that participants knew about and used were also analyzed. Massage (n = 464; 90.6%), acupuncture (n = 445; 86.9%), relaxation (n = 429; 83.8%), meditation (n = 423; 82.6%) and medicinal herbs (n = 365; 71.3%) were the mostly known modalities. Massage (n = 280; 54.7%), relaxation (n = 189; 36.9%), diet (n = 155; 30.3%), herbal medicines (n = 148; 28.9%) and meditation (n = 141; 27.5%) were the most frequently used modalities. The proportional difference between knowledge and use of CAM ranged from 2:1 to 11:1, with a significant reduction in the percentage of use of all 21 modalities assessed by the tool used in the research (Table 4).

Knowledge of CAM was significantly associated with female gender (OR = 1.495; p = 0.037) in the bivariate analysis. CAM in the promotion of a healthy university environment was associated with the female gender (OR = 2.029; p = 0.002) and knowledge of CAM (OR = 16.684; p = 0.000) (Table 5).

Paternal education (OR = 0.641; p = 0.024), employment (OR = 0.542; p = 0.028), health profession program (OR = 0.934; p = 0.047) and participation in extracurricular activities (OR = 1.275; p = 0.007) were associated with knowledge of CAM in the multivariate analysis. Female gender (OR = 2.089; p = 0.004) and having knowledge of CAM (OR = 16.601; p = 0.000) were associated with CAM in the promotion of a healthy university environment (Table 6).

4. Discussion

In recent years, patients have sought less invasive therapeutic approaches focused on health promotion and disease prevention.

Table 3

Analysis of university students' knowledge of Complementary Alternative and Medicine (CAM) in relation to academic semester, health profession and curriculum. Fortaleza, Ceará, 2017.

Academic Education			Knowledge of CAM ^a n (%)		p-value [#]
Health profession program	CAM in the curriculum	Semester	Yes	No	
Physical Education	Basic training	First year	20 (55.6)	10 (47.6)	0.563
		Last year	16 (44.4)	11 (52.4)	
Nursing	Basic training	First year	16 (47.1)	13(56.5)	0.483
		Last year	18 (52.9)	10 (43.5)	
Pharmacy	Basic and specific training	First year	14 (45.2)	15 (55.6)	0.430
		Last year	17 (54.8)	12 (44.4)	
Physical Therapy	Basic and specific training	First year	19 (41.3)	10 (83.3)	0.010*
		Last year	27 (58.7)	2 (16.7)	
Speech Therapy	Basic and specific training	First year	11 (50.0)	9 (37.5)	0.393
		Last year	11 (50.0)	15 (62.5)	
Medicine	Specific training	First year	9 (40.9)	19 (52.8)	0.380
		Last year	13 (59.1)	17 (47.2)	
Nutrition	Basic training	First year	11 (36.7)	19 (63.3)	0.039*
		Last year	19 (63.3)	11 (36.7)	
Dentistry	Basic training	First year	9 (37.5)	20 (57.1)	0.138
		Last year	15 (62.5)	15 (42.9)	
Psychology	Absent	First year	27 (56.2)	2 (18.2)	0.023*
		Last year	21 (43.8)	9 (81.8)	
Total		First year	136 (46.4)	117 (53.4)	0.117
		Last year	157 (53.6)	102 (46.6)	

CAM: Complementary Alternative and Medicine. ^aCompared with the first semester. [#]Chi-squared, *p < 0.05.

Table 4

University students' knowledge and use of Complementary Alternative and Medicine (CAM) in relation to each modality. Fortaleza, Ceará, 2017.

CAM	Knowledge n (%)	Use n (%)	Knowlegde/use ratio [*]
Massage	464 (90.6)	280 (54.7)	2:1
Acupuncture	445 (86.9)	75 (14.6)	6:1
Relaxation	429 (83.8)	189 (36.9)	2:1
Meditation	423 (82.6)	141 (27.5)	3:1
Medicinal herbs	365 (71.3)	148 (28.9)	2:1
Diet	334 (65.2)	155 (30.3)	2:1
Hydrotherapy	327 (63.9)	58 (11.3)	6:1
Music Therapy	318 (62.1)	57 (11.1)	6:1
Homeopathy	263 (51.4)	43 (8.4)	6:1
Aromatherapy	224 (43.8)	22 (4.3)	10:1
Reiki	220 (43.0)	47 (9.2)	5:1
Flower therapy	215 (42.0)	36 (7.0)	6:1
Prayer	187 (36.5)	66 (12.9)	3:1
Chiropractic	177 (34.6)	21 (4.1)	8:1
Chromotherapy	165 (32.2)	20 (3.9)	8:1
Reflexology	164 (32.0)	27 (5.3)	6:1
Crystals	148 (28.9)	13 (2.5)	11:1
Orthomolecular	132 (25.8)	16 (3.1)	8:1
Iridology	69 (13.5)	8 (1.6)	9:1
Liang Gong	46 (9.0)	10 (2.0)	5:1
Moxibustion	36 (7.0)	9 (1.8)	4:1

* Ratio of the number of university students who reported knowing and using Complementary Alternative and Medicine (CAM).

Furthermore, the support provided by regulatory policies have shown health professionals the need to develop competencies and skills to use CAM in their clinical practice.¹⁶

As a result of this demand, university students' knowledge of CAM has been analyzed in different studies worldwide. However, such studies have focused on medical students. This study used a different approach to evaluate knowledge of CAM in undergraduate university students enrolled in different health professions programs. In addition, it also analyzed the inclusion of subjects on CAM in the curricula of these programs and its relationship with knowledge of CAM, the relationship between knowledge and use of CAM, and students' opinion about the use of CAM in the promotion of a healthy university environment.

The university students analyzed in this research were

predominantly young (≤ 24 years old), women, single, White, and Catholic. In addition, most of them were unemployed and their parents had a higher education degree. These findings are in agreement with the findings reported in other Brazilian studies.^{17,18}

With regard to the relationship between CAM and health profession program, 46% of the participants reported knowing CAM. It should be noted, however, that medical students were the ones who exhibited the lowest percentages of knowledge of CAM. On the other hand, Psychology, Physical Therapy, Physical Education and Nursing students were the ones who exhibited the highest percentages of knowledge of CAM. There was an increase in the proportion of this indicator among final-year students compared with first-year students enrolled in eight health professions programs, mainly Physical Therapy and Nutrition. However, it should be noted that there was a decrease in the percentage of knowledge of CAM among final-year Psychology students and that CAM was not included in any of the subjects taught in the Psychology program.

Other studies conducted with students enrolled in health profession programs have assessed knowledge of CAM. A Japanese study conducted with dental students showed that 33% of the participants said they knew CAM.¹³ Two other studies conducted with medical students in Saudi Arabia¹⁹ and in the United States²⁰ found that students had adequate knowledge of some CAM modalities. The three studies demonstrate that CAM-related content is included in the curricula of the analyzed courses and that this is a key factor for the incorporation of CAM into clinical practice.

A review of 21 studies carried out in 14 countries in different continents has shown that university students, mainly medical students, lack knowledge of CAM.¹⁶ Joyce et al.¹⁶ emphasized the need to include CAM in the curriculum, particularly in the basic training of medical students. The authors also emphasized the need to foster discussion around the topic, prescribe CAM to patients, guide practitioners and contribute to scientific evidence.¹⁶ This knowledge deficit was also found in other studies involving Nursing²¹ and Pharmacy¹² students.

The limited knowledge of CAM is possibly caused by the difficulty of incorporating CAM into academic education due to some organizational, pedagogical and even scientific validation barriers. Padovan et al.²² suggest these barriers include the number of professionals and operationalization of services, organizational disputes, little investment in research, adequacy of pedagogical tools for teaching and holistic

Table 5

Bivariate analysis of sociodemographic and academic variables associated with university students' knowledge of Complementary Alternative Medicine (CAM) and promotion of a healthy university environment. Fortaleza, Ceará. 2017.

Variables	Knowledge of CAM	Crude OR (95%CI)	p-value [#]	CAM in the promotion of a healthy university environment	Crude OR (95%CI)	p-value [#]
Sociodemographic variables (block 1)						
Categorized age						
≤ 24 years	226 (77.1)	0.952 (0.629-1.440)	0.816	325 (77.9)	0.767 (0.455-1.292)	0.317
≥ 25 years	67 (22.9)	1		92 (22.1)	1	
Gender						
Men	78 (26.6)	1	0.037*	112 (26.9)	1	0.002*
Women	215 (73.4)	1.495 (1.023-2.185)		305 (73.1)	2.029 (1.265-3.255)	
Categorized race						
Non-White	146 (49.8)	1	0.673	207 (49.6)	1	0.540
White	147 (50.2)	0.927 (0.653-1.316)		210 (50.4)	0.867 (0.548-1.371)	
Categorized religion						
Catholic	182 (62.3)	1	0.309	270 (64.9)	1	0.983
Non-Catholic	79 (27.1)	0.799 (0.529-1.205)		106 (25.5)	1.010 (0.593-1.721)	
No religion	31 (10.6)	0.665 (0.354-1.249)		40 (9.6)	0.931 (0.414-2.094)	
Employment						
No	252 (86.0)	1	0.115 ^a	353 (84.7)	1	0.257
Yes	41 (14.0)	0.686 (0.428-1.098)		64 (15.3)	0.715 (0.400-1.279)	
Paternal education in years						
≤ 8 years	155 (53.3)	1	0.109 ^a	210 (50.7)	1	0.977
> 8 years	136 (46.7)	0.750 (0.527-1.067)		204 (49.3)	0.994 (0.628-1.571)	
Maternal education in years						
≤ 8 years	128 (43.7)	1	0.287	174 (41.7)	1	0.801
> 8 years	165 (56.3)	0.824 (0.577-1.177)		243 (58.3)	1.061 (0.667-1.689)	
Academic variables (block 2)						
Participation in extracurricular activities						
Yes	181 (61.8)	1.285 (0.900-1.834)	0.167 ^a	251 (60.2)	1.127 (0.709-1.791)	0.614
No	112 (38.2)	1		106 (39.8)	1	
Semester						
First year	136 (46.4)	1.325 (0.932-1.881)	0.117 ^a	206 (49.4)	0.957 (0.606-1.514)	0.852
Last year	157 (53.6)	1		211 (50.6)	1	
Knowledge of CAM						
No	–	–	–	10 (3.4)	1	0.000*
Yes	–	–	–	283 (96.6)	16.684 (8.375-33.238)	

CAM: Complementary Alternative and Medicine. OR: Odds Ratio. 95%CI: 95% Confidence Interval. #Chi-squared, *p < 0.05. ^ap values included in the regression model.

practice in curricula. Faculty members should have appropriate evidence-based educational expertise and materials and be influenced by positive experiences of clinical peers who prioritize the use of CAM.¹⁶ In Brazil, a study of 209 higher education institutions emphasized the need for a comprehensive and diversified CAM training in the various health professions. Despite regulations and regulatory bodies, just a few institutions offer courses on CAM.¹⁴ Given that, we reinforce the importance of including CAM-related content in the curriculum of universities so that future professionals can deliver diversified health care services.

The poor training of health professionals is a factor that hinders the use of CAM in health care services. The lack of information on CAM leads to devaluation and disinterest and contributes to the marginalization of the polysemous concept of synergistic knowledge.²³ We agree with Salles et al¹⁴ that it is necessary to rethink health teaching so that the knowledge of CAM is incorporated into the scientific pluralism in an alternative way and complementary to the current biomedical model of care.

In the present study, the use of the 21 modalities analyzed was considerably lower than the knowledge of such modalities. The most used CAM modalities were massage (54.7%), relaxation (36.9%), diet (30.3%), medicinal herbs (28.9%) and meditation (27.5%). Our findings are different from those reported by Nguyen et al²⁴ in a study of 403 undergraduate and graduate students in California, USA, where 67% of the participants used CAM; however, the modalities used by the students were the same as those found in our study. In contrast to our findings, a study of 68 undergraduate Medical, Pharmacy and Nursing students in Sierra Leone found a high percentage (61%) of use of CAM among final-year students, with herbal medicines, spirituality/prayer

and massage being the most common modalities used across the study population.²⁵

In our study we found that other factors besides academic education also influenced knowledge and use of CAM by this population. Factors such as female gender, level of education (≥ 8 years of study), unemployment, and participation in extracurricular activities, such as holding a teaching assistant position or a scientific initiation scholarship, were associated with greater knowledge of CAM. Previous studies that support our findings have shown that the use of CAM by university students is influenced by family attitudes, beliefs, cultural aspects^{26,27} personal experiences, media (internet and TV), academic education and faculty attitudes.²⁸

We also analyzed students' views of CAM in the promotion of a healthy university environment. More than 70% of the participants believed that CAM could promote a healthy university environment and such view was associated with female gender and knowledge of CAM. However, this belief was less reported by Dental and Medical students. Our findings agree with a cohort study of 39 American university students that found that knowledge of CAM is associated with personal health promotion.²⁰ The study found that when evidence-based CAM is incorporated in the curriculum and taught by faculty members with expertise in integrative therapies, students significantly increase their knowledge/use of CAM. In addition, the incorporation of CAM in the curriculum had an impact on students' personal health practices, including better sleep, exercise, stress management and decreased alcohol use.²⁰ Thus, it is important for universities to recognize that the use of CAM in the university environment can contribute to promoting the health of students, professors, employees and community.²⁹

Universities are a favorable setting for interventions that promote

Table 6

Multivariate analysis of the sociodemographic (block 1) and academic (block 2) variables associated with university students' knowledge of Complementary Alternative Medicine (CAM) and promotion of a healthy university environment. Fortaleza, Ceará. 2017.

CAM	β	Adjusted OR (95%CI)	p-value [#]
Knowledge of CAM			
Block 1			
Gender	0.338	1.403 (0.934 – 2.107)	0.103
Employment	–0.491	0.612 (0.363 – 1.030)	0.065
Paternal education in years	–0.439	0.641 (0.441 – 0.944)	0.024*
Block 2			
Gender	0.349	1.418 (0.933 – 2.155)	0.102
Employment	–0.612	0.542 (0.314 – 0.937)	0.028*
Paternal education in years	–0.324	0.724 (0.483 – 1.084)	0.117
Health profession program	–0.068	0.934 (0.873 – 0.999)	0.047*
Academic semestre	0.254	1.289 (0.871 – 1.910)	0.204
Participation in extracurricular activities	0.243	1.275 (1.070 – 1.521)	0.007*
CAM in the promotion of a healthy university environment			
Block 1			
Gender	0.708	2.029 (1.265 – 3.255)	0.003*
Block 2			
Gender	0.629	1.876 (1.099 – 3.201)	0.021*
Knowledge of CAM	2.809	16.601 (8.293 – 33.234)	0.000*
Health profession program	–0.095	0.909 (0.819 – 1.009)	0.073

CAM: Complementary Alternative and Medicine. OR: Odds Ratio. 95%CI: 95% Confidence Interval. ^aCompared with the health profession (Medicine) that exhibited the lowest percentage of knowledge. [#]Chi-squared, *p < 0.05.

health and hence can contribute to the development of healthy environments and health care teaching, research and extension activities through intersectoral support and partnerships with the community.²⁹ Therefore, a healthy university must integrate health into its educational, organizational and work structure and focus on activities to promote a healthy lifestyle among students, praising diversity and experiences and including environmental sustainability strategies.^{30,31} Thus, the principles of CAM can be important tools for fostering health promotion in the university as they promote a more comprehensive view of individuals' health care considering their biopsychosocial and spiritual aspects.

Some limitations of the present study should be highlighted. For instance, detailed information on the knowledge and use of CAM, such as source of information, frequency of use or motivation to use, were not assessed. It should be noted that our study used only closed-ended questions – that is, questions that could only be answered with either “yes” or “no” – about self-reported knowledge and specific use of each CAM modality. In addition, personal or professional experience of CAM were not analyzed. It should also be noted that the influence of academic education was measured using cross-sectional data – and not longitudinal data – from first-year and final-year students.

5. Conclusion

Health professions students' knowledge of CAM was influenced by academic education and differed according to the specific curricula of each of the nine health professions programs and academic semester. In addition, gender, paternal education, employment, and participation in extracurricular activities are factors associated with knowledge of CAM. The use of CAM modalities was significantly lower compared with knowledge of CAM. The relationship between CAM and healthy university environment perceived by some students was influenced by gender and knowledge of CAM.

Thus, the use of CAM can promote a healthy university environment, contributing to improve the quality of life and physical and mental well-being of the population (students, teachers, employees and community) in this educational setting.

The findings of this study seek to raise educational managers', faculty members' and students' awareness of the importance of incorporating CAM into the curricula of health professions programs. In addition, the findings show that CAM should be based on evidence and

taught by faculty members with expertise. This could have a direct impact on the training of future health professionals and contribute to greater safety in the heterogeneous management of the health-disease process based on the shared accountability for health care and the multiple skills and abilities necessary to meet patients' demands. Further longitudinal studies should be conducted to assess the use of CAM practices by students in their professional life.

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