

Influence of Gender and Educational Background on Pharmacy Students' Perception of CAMs: A Survey-Based Study

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ABSTRACT

Background: Complementary Alternative Medicine (CAMs) was extensively Utilized across countries for managing chronic and acute condition, with practices including Acupuncture, Ayurvedic, meditation, chiropractic, naturopathy. This study aims to appraise the Knowledge, Attitude and Perception (KAP) of CAMs among Pharmacy Students of a private institution in Chennai. **Materials and Methods:** A cross-sectional survey study was conducted among undergraduate and postgraduate pharmacy students of College of Pharmacy Chennai using Google-form. This survey contains four domains composed of 34 questions about knowledge, attitude and perception of CAMs. **Results:** Among the total participants, 41% were male and 59% were female. Statistically significant differences were observed in participants KAP scores based on their qualification ($p=0.002$) and year of study ($p=0.008$), respectively. **Conclusion:** More than 70% of the pharmacy students demonstrated good knowledge, attitude and perception towards CAMs; however, scope for improvement remains. Inclusion of CAMs in the pharmacy curriculum could further enhance students KAP. Gender was identified as a factor influencing CAMs usage.

Keywords: Attitude, CAMs, Knowledge, Perception, Pharmacy Students.

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INTRODUCTION

Over time, some traditional methods have evolved into widely recognized health care practices, now commonly referred to as "complementary and alternative medicine" (Ahmad *et al.*, 2017). Based on National Centre for Complementary and Alternative Medicine (NCCAM) stating that "A combination of distinct medical and health care systems, practices, and products that are not directly held to be part of conventional medicine." It defines that complementary medicine is used along with conventional medicine, whereas alternative medicine replaces the conventional medicine (Ashraf *et al.*, 2019). CAMs therapy helps to prevent or promote health conditions. Some of the home-based remedies were also used for different infirmities or as a simple prophylactic treatment in both developing and developed countries. CAMs use varies based on age, gender and the factor range. It was commonly or mostly consumed at the chronic conditions like Cancer etc., (Awad *et al.*, 2014). The herbal medicine available

to all citizens with or without prescription but the choice of any type of medicine depends on the socio-economic status and culture factor. An Australian study found that the most frequently used Complementary and Alternative Medicines (CAM) are vitamins and minerals, with 80.9% of people using them, and herbal medicines, used by 40.9%. Additionally, 90.5% of women reported using CAM (Patwardhan *et al.*, 2023). CAMs and Conventional therapy use vary from place to place across the world, but with the constant shifting. The growing popularity of traditional medicine led the WHO to encourage the integration of traditional and complementary medicine into national healthcare systems, aiding in the creation of national policies and regulations (Clossey *et al.*, 2023). Also, requires the unification of CAMs into health professional education. In most of the countries, pharmacist plays a major role in patient interaction as well as helps them to understand the safety and effective use of all medicine. As the pharmacist, it is lawful to deal with CAMs according to drug act 2012. Among India, people have believed regarding CAMs. 79.7% think that conventional medicine could gain from the beliefs and practices found in Complementary and Alternative Medicine (CAM) (Hareg *et al.*, 2022). It shows that the student's attitude toward CAM was positive. In this regards the specification of the crude drug was taught under pharmacognosy as a part of Bachelor of Pharmacy



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and Doctor of Pharmacy degree curriculum. Another study was conducted among pharmacy students in Hong Kong. Around 94 were using traditional Chinese medicine. The attitude shows that 40% positive, 59% neutral and 1% negative. The mean score for the curriculum in TCM knowledge were 3.2 and 3.6 (Jeremy *et al.*, 2023). Other alternative medicines like Siddha, Ayurveda, Unani, Homeopathy, and Naturopathy were practiced as a separate degree course according to UAH act 1956. Therefore, it is equally important to explore CAMs usage among non-medical students as they are more exposed to unsuitable or incongruous use of CAMs (Eshkevari, 2017).

MATERIALS AND METHODS

Study Design: Cross-Sectional Study (Survey)

Study Site and duration: It is a 4-month study carried out in the Saveetha College of Pharmacy, Saveetha Institute of Science Technology and Advanced Studies, Chennai, Tamil Nadu, India.

Target Population: Under Graduate (UG) and Post Graduate (PG) Pharmacy Students (B. Pharm, Pharm. D, M. Pharm and B. Pharm LE).

Inclusion and Exclusion Criteria

- Both UG and PG pharmacy students were included in this study.
- Students with Incompletion and no consenting participants.
- Other department students were excluded based on unrelated education.

Sampling Procedure

The sample size was determined using Rao-soft software, assuming a 50% response rate, a 5% alpha error, and a 95% confidence level.

Formula,

$$x = Z(c/100)2r(100-r)$$

$$n = N x / ((N-1) E^2 + x)$$

$$E = \text{Sqrt} [(N - n) x / n(N-1)]$$

Where N is the population size, r is the fraction of responses that you are interested in, and $Z(c/100)$ is the critical value for the confidence level c.

Estimated Sample Size: 249.

Study Instrument

The research tool was a survey questionnaire with 34 questions in English. It was divided into four sections: the first gathered demographic information about the respondents; the second assessed their knowledge of CAMs; the third and fourth sections

explored the students' attitudes and perceptions toward CAMs. Questions related to knowledge, attitudes, and perceptions used a Likert Scale for responses.

Validation Procedure

Four academic professionals, who are pharmacists with expertise in Pharmaceutical Sciences, validated the questionnaire. It was then thoroughly edited and checked for spelling and grammatical errors.

Piloting of the Questionnaire

The survey was tested on 10 pharmacy students and validated. On average, it took about 20 min to complete, and the students found it easy to understand. The reliability analysis showed a Cronbach's alpha value of 0.72.

Research Ethics

Before the study process, the informed consent of the study participants got done. Participants said that their personal information will be confidential and will be used only for research purposes.

Study Procedure

This study aimed to assess the knowledge, attitude, and perception of Complementary and Alternative Medicine (CAM) among pharmacy students at a private institution in South India (Tamil Nadu). The study commenced after obtaining approval from the institutional ethics committee. Surveys were distributed among Undergraduate (UG) and Postgraduate (PG) students in the pharmacy department. Students who submitted incomplete responses were excluded to avoid bias. The collected data were entered into a Microsoft Excel spreadsheet and prepared for statistical analysis. Following data collection, information regarding CAM was provided orally.

Statistical Analysis

The data gathered from Google Forms were transferred to a Microsoft Excel spreadsheet and subsequently analyzed using SPSS software. Demographic and knowledge data were presented as numbers and percentages. For inferential statistics, the Chi-square test for independence was used. A *p*-value of less than 0.05 was considered statistically significant.

RESULTS

The majority of the study participants (78%) were between 20 and 22 years old, with 58% falling in the 17-to-19-year age group (Figure 1). Most participants were female, comprising 59.30% of the sample (Figure 2). Regarding educational background, 59.30% were students Pharm. D students, followed by B. Pharm (29.06%), M. Pharm (6.97%), and B. Pharm (Lateral Entry) (4.655) (Figure 3). When asked about their health status, 72.09% described their health as good, 22.09% as excellent, and 5.81% as

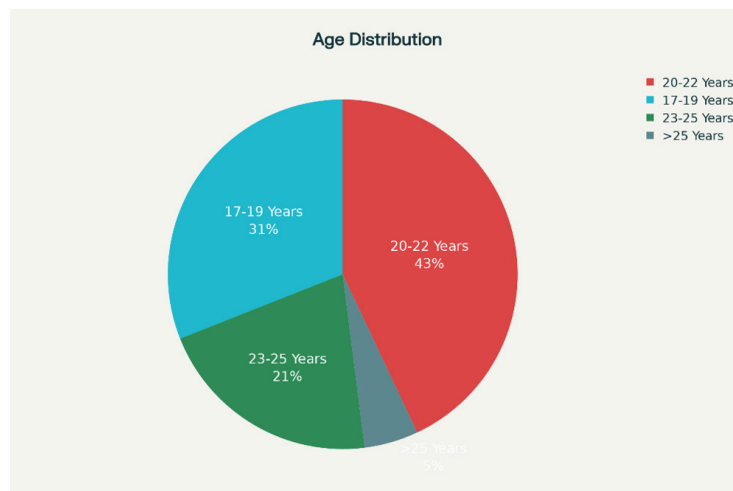


Figure 1: Age based distribution in Percentage among the study population of Pharmacy Student.

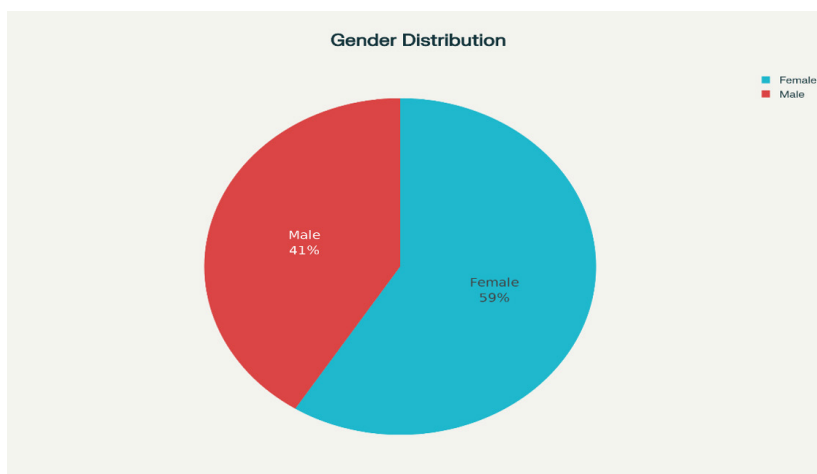


Figure 2: Gender based distribution in Percentage among the study population of Pharmacy students.

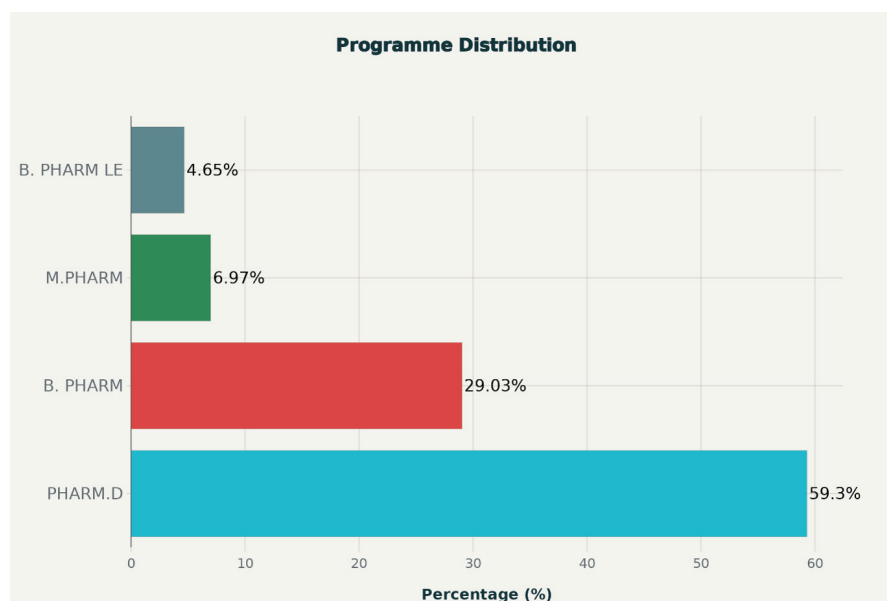


Figure 3: Programme based distribution of Pharmacy Students Includes Bachelor of Pharmacy-Practice, Master of Pharmacy, Bachelor of Pharmacy, and Doctor of Pharmacy.

poor. In response to questions about CAM usage, 37.20% reported using CAM therapies, while 62.79% said they did not (Mortada, 2024). Education was cited as the main source of information about CAMs would be used, 33.72% said only for acute illnesses and 38.37% only for nutritional conditions. Following described in Table 1.

For the knowledge domain, 69.07% of students responded to relevant questions, with 58.13% agreeing and 20.93% strongly agreeing with key knowledge items. Approximately 45.34% believed herbal medicine to be safe and natural, while 68% of pharmacy students and 51.08% of non-pharmacy students correctly identified garlic as reducing blood lipid levels (Ashraf *et al.*, 2019; Malapela *et al.*, 2022). However, 39.53% were unsure if *Nux-vomica* (poison nut) could treat symptoms related to overacting or alcohol consumption (Table 2).

In terms of attitude, 32.55% agreed and 45.34% were uncertain about CAM efficacy over conventional therapy. Nearly half (49.3%) agreed that natural health products can treat illness, and 10.6% strongly agreed with this statement (Awad and Al-Shaye, 2014; Sandra Salm *et al.*, 2023). Most participants (62.79%) agreed that pharmacists should provide CAM information, while 45.34% agreed and 41.86% strongly agreed that CAM knowledge is important for pharmacists. Regarding the potential benefits of CAM to conventional medicine, 69% agreed and 23% strongly agreed (Yeo *et al.*, 2005; Lee 2010). Following describe below in Table 3.

Perceptions were also generally positive out of respondents, 56.97% agreed and 29.09% were uncertain about the importance of including CAM courses in paramedical education. Around 27.90% strongly agreed that pharmacists should counsel patients about CAMs, and 37.20% agreed while 39.53% were unsure about the superiority of CAM therapies. Nearly half (47.67%)

were uncertain whether CAM is superior to conventional therapy. Statistically significant difference in KAP scores were found based on participants qualification ($p=0.002$) and year of study ($p=0.008$). Many students were reluctant to discuss CAMs with their doctors, although 42.4% occasionally did so during consultations. The details of these findings are further illustrated in the referenced (Table 4).

DISCUSSION

This study is the first known investigation of CAM KAP among pharmacy students in Tamil Nadu, and the result indicate generally positive attitudes towards CAMs, despite some gaps in knowledge, particularly regarding therapies like naturopathy and chiropractic. The data demonstrate good overall familiarity, as many students recognized benefits associated with herbal medicines, although understanding of some specific modalities, such as fasting or the use of *Nux-vomica* (poison nut), was limited. Attitudes were consistent with findings from other studies, showing openness to natural health remedies, but also ambivalence about the comparative effectiveness of CAMs versus conventional treatments. Importantly, a notable proportion of students acknowledge the pharmacist's role in providing information about CAMs and there was broad support for integrating CAM instruction into pharmacy curricula. This study also highlighted that gender may be an influencing factor for CAM use and attitudes. As in similar studies, most respondents supported the addition of CAM coursework to their education, suggesting that such integration could help bridge existing knowledge gaps and improve confidence in professional counselling about CAMs. This study primary strength is its novelty, representing the first survey-based investigation of the knowledge, Attitude and Perception of Complementary and Alternative Medicine (CAMs) among pharmacy students in Tamil Nadu, South India and providing valuable localized insights relevant for curriculum

Table 1: Shows the no. of study participants (N) and percentage (%) of demographic details based on Health, Therapy, Source and the therapy duration.

Sl. No.	Questions	Answers	N (%)
1.	Describe your health	Poor	10 (5.81%)
		Good	124 (72.09%)
		Excellent	38 (22.09%)
2.	Do you use CAMs therapy	Yes	64 (37.20%)
		No	108 (62.79%)
3.	Source of information about CAMs	Education	98 (56.97%)
		Social media/TV	40 (23.25%)
		Family	28 (16.27%)
		Others	6 (3.48%)
4.	During what condition you will use CAMs therapy.	Acute Illness	58 (33.72%)
		Chronic Illness	48 (27.90%)
		Nutritional Based	66 (38.37%)

Table 2: Represent the no. of response in Total (N) and Percentage (%) for Knowledge based CAMs questions.

Sl. No.	CAMs Therapy	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1.	Acupuncture helps to decrease withdrawal symptoms and relieve pain.	36 (20.93%)	100 (58.13%)	30 (17.44%)	02 (01.16%)	04 (02.32%)
2.	Herbal medicine is natural and safe without side effects.	44 (25.58%)	78 (45.34%)	34 (19.76%)	10 (05.81%)	06 (03.48%)
3.	Ayurveda medicines in addition to conventional medicine generate improved patient satisfaction.	30 (17.44%)	92 (53.48%)	44 (25.58%)	06 (03.48%)	0
4.	Meditation makes people become more aware of their negative thoughts.	20 (11.62%)	76 (44.18%)	66 (38.37%)	08 (04.65%)	02 (01.16%)
5.	Yoga practice is being used in the prevention and treatment of medical illness.	76 (44.18%)	68 (39.53%)	20 (11.62%)	08 (04.65%)	0
6.	Fasting is the first line management in naturopathy.	14 (08.13%)	58 (33.72%)	92 (53.48%)	06 (03.48%)	04 (02.32%)
7.	The most frequent clinical uses of hypnosis include breaking bad habits, overcoming insomnia, recalling. Forgotten experiences, and as an anesthetic for pain management.	10 (05.81%)	78 (45.34%)	70 (40.69%)	14 (08.13%)	0
8.	<i>Nux-vomica</i> (poison nut) treats the symptoms of overeating or over consumption of alcohol.	18 (10.46%)	74 (43.02%)	68 (39.53%)	10 (05.81%)	02 (01.16%)
9.	Chiropractic therapy specializes in spinal manipulation and helps to treat low back pain.	24 (13.95%)	54 (31.39%)	62 (36.04%)	10 (05.81%)	02 (01.16%)
10.	Massage therapy often makes patient feel better temporarily but does not lead to objective improvement in long-term outcome for patient.	42 (24.41%)	88 (51.16%)	24 (13.95%)	16 (09.30%)	02 (01.16%)

Table 3: Represent the no. of response in Total (N) and Percentage (%) for Attitude based CAMs questions.

Sl. No.	Attitude Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1.	CAMs therapy is more effective than conventional therapy.	12 (06.97%)	56 (32.55%)	78 (45.34%)	22 (12.79%)	04 (02.32%)
2.	The pharmacist responsibility is to provide information regarding CAMs.	38 (22.09%)	108 (62.79%)	20 (11.62%)	06 (03.48%)	0
3.	It is necessary for the patient to inform the pharmacist about their herbal therapies while seeking medical advice.	80 (46.51%)	74 (43.02%)	16 (09.30%)	02 (01.16%)	0
4.	I will take CAMs treatment only by family recommendation.	18 (10.46%)	52 (30.23%)	60 (34.88%)	38 (22.09%)	04 (02.32%)
5.	I will take CAMs treatment only by doctor recommendation.	44 (25.58%)	86 (50%)	28 (16.27%)	14 (08.13%)	0
6.	CAMs should be limited only to patient who have failed conventional Therapy.	28 (16.27%)	58 (33.72%)	52 (30.23%)	32 (18.60%)	02 (01.16%)
7.	Selection of CAMs as first line therapy is inappropriate.	26 (15.11%)	74 (43.02%)	60 (34.88%)	10 (05.81%)	02 (01.16%)
8.	CAMs is more cost-effective than modern medicine.	20 (11.62%)	52 (30.23%)	62 (36.04%)	32 (18.60%)	06 (03.48%)
9.	Knowledge about CAMs is important to me as a pharmacy Student.	72 (41.86%)	78 (45.34%)	18 (10.46%)	04 (02.32%)	0
10.	CAMs therapy stimulate body's natural healing power.	28 (16.27%)	102 (59.30%)	38 (22.09%)	04 (02.32%)	0

Table 4: Represent the no. of response in Total (N) and Percentage (%) for Perception based CAMs questions.

Sl. No.	Perception Questions	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1.	CAMs are appropriate in disease management.	12 (06.97%)	50 (29.06%)	54 (31.39%)	16 (09.30%)	0
2.	Integration of CAMs course in paramedical education is important.	32 (18.60%)	98 (56.97%)	38 (22.09%)	02 (01.16%)	02 (01.16%)
3.	Consulting healthcare professional before CAMs use is important	46 (26.74%)	50 (29.06%)	26 (15.11%)	08 (04.65%)	02 (01.16%)
4.	Pharmacist should counsel patient on CAMs use.	48 (27.90%)	88 (51.16%)	24 (13.95%)	14 (08.13%)	0
5.	The CAMs treatment is suitable for all age	28 (16.27%)	54 (31.39%)	74 (43.02%)	16 (09.30%)	0
6.	CAMs therapies are better than conventional medicines.	08 (04.65%)	64 (37.20%)	68 (39.53%)	30 (17.44%)	02 (01.16%)
7.	Lack of trained staff is a barrier towards CAM therapy.	30 (17.44%)	84 (48.83%)	44 (25.58%)	12 (06.97%)	02 (01.16%)
8.	CAMs take longer duration for treatment.	30 (17.44%)	74 (43.02%)	54 (31.39%)	12 (06.97%)	02 (01.16%)
9.	CAMs therapy is superior than conventional therapy.	14 (08.13%)	48 (27.90%)	82 (47.67%)	24 (13.95%)	04 (02.32%)
10.	Using both conventional and alternative therapies is better than using one alone.	18 (10.46%)	70 (40.69%)	60 (34.88%)	18 (10.46%)	06 (03.48%)

development and awareness programs. The study utilized a validated KAP instrument, allowing for robust assessment of student knowledge gaps and attitudes toward diverse CAM modalities. However, several limitations mirror those seen in related research. The moderate sample size and response rate may restrict the generalizability of findings beyond the study population, and significant cultural and educational variability across regions means results may not reflect the broader attitude or practices of Indian pharmacy students or healthcare professionals. As in other published surveys, recall bias could affect the accuracy of self-reported CAM usage or perceptions, and the cross-sectional study design does not allow for causal inference between educational interventions and KAP outcomes. Additionally, students-like their international counterparts-may have limited depth of knowledge or clinical confidence regarding specific CAM therapies despite generally positive attitudes. Overall, the study adds valuable evidence to regional CAM research while highlighting areas for further improvement in pharmaceutical education and future study design.

CONCLUSION

This study highlights the importance of educating future healthcare professionals about Complementary and Alternative Medicines (CAMs). The majority of participants supported the inclusion of CAM-related courses in the pharmacy curriculum. Moreover, the findings emphasize the need for more comprehensive data on

Knowledge, Attitudes, and Practices (KAP) concerning CAMs. Gender differences were also observed in CAM usage, suggesting the need for further investigation in this area.

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ABBREVIATIONS

CAMs: Complementary and Alternative Medicines; **KAP:** Knowledge, Attitude, and Perception; **UG:** Undergraduate; **PG:** Postgraduate; **B. Pharm:** Bachelor of Pharmacy; **Pharm.D:** Doctor of Pharmacy; **M. Pharm:** Master of Pharmacy; **SPSS:** Statistical Package for the Social Sciences; **NCCAM:** National Center for Complementary and Alternative Medicine; **WHO:** World Health Organization; **TCM:** Traditional Chinese Medicine; **UAH:** Unani, Ayurveda, Homeopathy.

CONFLICT OF INTEREST

The authors have no conflicts of interest regarding this investigation.

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