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Experiences in Teaching and Learning

## Association of pharmacy students' cultural beliefs with perceived knowledge, beliefs, confidence, and experience with complementary medicine



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### ABSTRACT

**Background and purpose:** Culture has been shown to inform patients' acceptance and use of complementary medicine (CM) treatment. It is unknown how a pharmacist or pharmacy student's culture may be associated with perceptions of CM relating to patient care. Gaining a better understanding of this concept within student populations may inform educational needs for programs situated within culturally diverse settings. The purpose of this study was to explore how pharmacy students' cultural beliefs influence perceived knowledge, confidence, and practice with respect to CM.

**Educational activity and setting:** A cross-sectional survey was distributed to all undergraduate pharmacy (professional years 1–4) and postgraduate doctor of pharmacy students. Results from the item “CM is an important aspect of my culture” were correlated with all other items using Spearman's correlation coefficient.

**Findings:** Senior students who had completed a two-credit hour course appeared to be more confident in their practice skills relating to CM and showed positive correlations with culture and effectiveness of CM. Senior students acknowledged the importance of CM knowledge as a student and within pharmacy practice. Junior students showed a positive correlation with culture and past use.

**Summary:** Pharmacy students in the College of pharmacy were positive towards the use of CM, with culture playing an important role. Students who perceived CM as an important aspect of their culture were more confident in their practice skills relating to CM. Future research is required to assess impact of students' cultural beliefs on practice.

### Background and purpose

The National Center for Complementary and Integrative Health defines complementary and alternative medicine (CAM) as “a non-mainstream practice used together with conventional medicine.”<sup>1</sup> The World Health Organization reports that the use of CAM is on the rise.<sup>2</sup> Access to CAM is also increasing with herbal products being sold over-the-counter and available for purchase without referral from a physician.<sup>3</sup> Complementary medicines (CM) include natural products such as herbs, vitamins, minerals and probiotics. More than 50% of the world's population and 38% of the United States' population have been found to use CM in conjunction with

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conventional treatment.<sup>4,5</sup> Pharmacists are essential for the safe and effective use of these therapies, as many products and services are offered through pharmacies or have the potential to influence the efficacy and safety of drug therapy. As patient demand for these products continues to increase, it is important to understand the factors that may influence use. Interestingly, a patient's culture has been shown to inform how they perceive, accept, and ultimately use CM treatments.<sup>6</sup> A patient's cultural beliefs and background can also hinder their adherence to medication.<sup>7</sup> It is unknown, however, how a pharmacist or pharmacy student's culture may be associated with their perceptions of CM relating to patient care.

While curricular programming can increase students' knowledge and skills with respect to CM, modern interventions may need to account for students' values, beliefs, and experiences in order to stimulate learning and enhance their ability to provide effective care. Accounting for students' values and beliefs can increase engagement and interest, resulting in a more fruitful learning environment.<sup>8</sup> Studies from nursing and medicine have shown positive student attitudes towards CAM; however, these studies and a study conducted with dental students suggested curricular reform was required as students expressed limited knowledge of CAM. To date, the majority of the literature solely focused on knowledge and attitudes, rather than cultural beliefs.<sup>9–11</sup> It is well known that CM use differs worldwide and as such, culture may play an important role in how one views CM therapies.<sup>2</sup> In the era of globalization, this may be an important point to consider when designing curricular programming for a culturally diverse student population. Students' cultural beliefs regarding CM may influence how they react and respond to learning material, especially if the potential for culturally divergent beliefs are not accounted for by the program or instructor. To date, little information exists regarding students' cultural beliefs and perceptions with respect to CM. Gaining a better understanding of this concept within student populations may therefore inform future research and educational needs for programs situated within culturally diverse settings. The aim of this study was to explore how pharmacy students' cultural beliefs influence perceived knowledge, confidence, and practice with respect to CM and natural products.

#### Educational activity and setting.

The objectives of this study were addressed by using a cross-sectional survey distributed to all undergraduate pharmacy students (professional years 1–4) and postgraduate doctor of pharmacy (PharmD) students studying within the College of Pharmacy, Qatar University. Students in professional years 1 and 2 (junior students) had limited exposure to CM concepts and topics and had not completed any experiential clinical rotations. Professional years 3, 4, and PharmD students (senior students) had all completed a two-credit hour 'Pharmacognosy Alternative/Complementary Treatments' course and had at least one four-week experiential training experience within clinical practice. Student learning objectives for the course included identifying differences between herbal therapies and conventional drugs, classifying herbal therapies based on chemical classes of active constituents, pharmacological action and clinical use, and utilizing reliable sources to decide if herbal preparations are appropriate based on clinical efficacy and patient conditions. All students at the college of pharmacy at this time were female. Qatar University Institutional Review Board reviewed the study proposal and issued exemption from a full ethics review (IRB 1003-E/18). All participants provided informed consent.

Responses were received using an online survey tool. The survey was largely adapted from previously published work within this field.<sup>4,12,13</sup> The survey was piloted with four masters students in the college of pharmacy to assess for clarity, language, question structure, and understanding. These responses were excluded from the study results. After user validation, two investigators altered the wording of several items to ensure question clarity and understanding and removed questions to avoid repetition. The final version of the survey had a total of 24 items, 20 of which had response categories using a 5-point Likert rating (strongly disagree, disagree, neutral, agree and strongly agree). The survey had three key domains: beliefs and uses (six items), perception (eight items), and knowledge (six items).

Two investigators distributed the survey via an email link after a short presentation to students to discuss the study purpose and objectives. The survey was conducted using the web-based application Google Forms. Following the initial email with the survey link, reminders were sent out to students after one and two weeks. The survey remained open for four weeks. There were no incentives for students to complete this survey and student participation was entirely voluntary. To reduce risk of bias and maintain student confidentiality, no identifiers were captured and the responses remained anonymous.

For the purposes of this study, results from the item "CM is an important aspect of my culture" were correlated with all other items using Spearman's correlation coefficient in order to determine how cultural beliefs may influence knowledge, perceptions, beliefs, and experience. These tests were conducted for two groups of students. Group 1 consisted of junior students who had not taken formal pharmacognosy training, while group 2 was senior students with pharmacognosy training and greater amounts of practice-based experiences. For all statistical analyses, we tested the null hypothesis of no correlation ( $\rho = 0$ ). Statistical significance was determined to be at an alpha level of 0.05. All analyses were completed using SPSS, version 25 (IBM Corporation).

#### Findings.

The response rate for the survey was 53% (63 of 119 students responded). The demographic characteristics of the students are summarized in [Table 1](#). A higher response rate was observed within senior students compared to junior students (59% vs. 41%, respectively). The majority of students were from the Middle East region and 35% identified as "Other."

[Table 2](#) summarizes the mean responses obtained from answers to the included statements (1 = strongly disagree to 5 = strongly agree). [Table 2](#) also provides the correlation coefficients of each statement correlated to the statement "CM is an important aspect of my culture." Results show a general appreciation for CM from both student groups. Senior students appeared to be more confident with their practice skills relating to CM as opposed to junior students. Senior students that believed CM to be an important part of their culture had significant positive correlations with their interest in CM ( $r = 0.386$ ), use of effective CM ( $r = 0.331$ ), perceived importance of knowledge as a student ( $r = 0.325$ ), perceived importance of knowledge for future pharmacy practice ( $r = 0.469$ ), importance of pharmacist awareness about CM ( $r = 0.395$ ), and their confidence in CM uses and indications ( $r = 0.370$ ). For junior

**Table 1**  
Demographic characteristics of survey respondents.

Characteristic	Frequency n (%)
Age	
Less than 20	13 (21)
Between 21 and 24	49 (78)
25 or over	1 (2)
Country of origin	
Qatar	3 (5)
Egypt	22 (35)
Jordan	4 (6)
Palestine	8 (13)
Syria	4 (6)
Lebanon	0
Other	22 (35)
Professional Year	
P1 (junior students)	11 (17)
P2 (junior students)	15 (24)
P3 (senior students)	21 (33)
P4 (senior students)	13 (21)
PharmD (senior students)	3 (5)

PharmD = Doctor of Pharmacy; P1 = professional year 1; P2 = professional year 2; P3 = professional year; P4 = professional year 4.

**Table 2**  
Mean responses and correlation coefficients obtained across groups of junior and senior students.

Statement	Junior students		Senior students	
	Mean (SD)	Correlation	Mean (SD)	Correlation
CM is an important aspect of my culture	3.9 (0.83)	–	4.0 (0.91)	–
I am personally interested in CM	3.9 (0.84)	0.267	3.6 (1.0)	0.386 <sup>a</sup>
I have used CM in the past for any reason	4.2 (0.51)	0.475 <sup>a</sup>	4.1 (0.94)	0.273
CM has been effective for personal use in past	3.6 (0.81)	0.334	3.6 (1.2)	0.331 <sup>a</sup>
I, or someone I know, is using CM to treat a problem/symptom for the long term (i.e. more than 4 weeks)	3.0 (1.3)	–0.154	2.8 (1.4)	0.187
Patients should have the right to choose between conventional and complementary/alternative approaches in healthcare	3.4 (1.1)	0.256	4.1 (0.94)	0.165
Knowledge about CM is important to me as a student	4.7 (0.55)	0.250	4.5 (0.61)	0.325 <sup>a</sup>
A course focusing on CM should be included in the pharmacy curriculum	4.5 (0.76)	0.196	4.1 (0.91)	0.159
Knowledge about CM is important in my future practice of pharmacy	4.4 (0.76)	0.262	4.2 (0.94)	0.469 <sup>a</sup>
There is a good evidence base for the clinical effectiveness of CM	2.8 (0.78)	0.138	2.7 (1.1)	0.175
I am confident in the clinical effectiveness of CM	3.3 (0.79)	–0.031	3.2 (1.1)	0.235
A pharmacist should be aware of the CM approaches in healthcare	4.6 (0.58)	–0.003	4.4 (0.72)	0.395 <sup>a</sup>
CM is a threat to public health and is harmful to patients' well-being	2.8 (1.1)	0.273	2.4 (1.2)	–0.234
CM are generally safe	2.7 (0.92)	0.197	2.8 (0.95)	–0.176
I can identify commonly available CM in the pharmacy	2.6 (0.80)	0.081	3.5 (1.1)	0.264
I am familiar with the different uses/indications for CM	2.5 (0.91)	–0.059	3.5 (0.80)	0.370 <sup>a</sup>
I can identify the differences between CM and conventional drugs	3.1 (0.89)	0.133	3.9 (0.84)	0.006
I can identify common herb-drug interactions of CM	2.5 (0.81)	–0.065	3.5 (1.0)	0.200
I can recognize common adverse effects of CM	2.4 (0.75)	–0.302	3.1 (1.0)	0.175
I am confident to counsel patients using CM	2.2 (0.73)	–0.001	3.2 (0.99)	0.316

CM = complementary medicine.

<sup>a</sup> Comparison was statistically significant.

students, the only statistically significant correlation with “CM is an important aspect of my culture” was for past use of CM ( $r = 0.475$ ). No other significant correlations were found between other items.

## Discussion

The purpose of this study was to explore how pharmacy students' cultures may influence their perceived knowledge, beliefs, confidence, and practice with respect to CM and natural products. Overall, there was a high acceptance of CM from students both before (junior students) and after (senior students) completing the 'Pharmacognosy Alternative/Complementary Treatments' course. Furthermore, many students had positive attitudes towards CM and agreed that it is an important part of their culture.

The findings from this study demonstrate that students' cultural beliefs should be considered and accounted for when designing instruction related to CM. Interestingly, the only significant association between cultural importance of CM was with past CM use for junior students who had not yet taken formal instruction on CM topics. This may be largely a result of decreased exposure to pharmacy practice opportunities and experiential education. Significant associations were found across the items of personal interest, use, perceived importance for practice, knowledge of CM uses, and confidence for students who had received formal instruction (two-credit course) and had at least four weeks of structured experiential education experiences. These students may therefore have a better understanding of pharmacy practice and the role of CM for patient care. These results also show that despite receiving evidence-based instruction in the area of CM, cultural beliefs are likely to still influence students' confidence and future practice intentions.

This study shows that based on cultural roots, students' acceptance of CM may influence their decision-making process within patient care practice environments. This is consistent with the literature where a study with Australian community pharmacists in a multicultural environment found that interactions between the community pharmacists and patients were on occasion complicated by cultural barriers.<sup>14</sup> Future studies should be designed to test this hypothesis, but the preliminary data from our study demonstrates that those students who perceive CM as an important aspect of their culture also perceive CM to be of greater importance and are more confident in their practice skills related to CM. Previous studies have shown that previous use, culture, and personal interest may play a positive role when counseling or advising patients with respect to CM.<sup>15,16</sup> In the era of globalization, it may be important to recognize the influence of culture on a students' practice intentions by program staff, including preceptors and other inter-professional colleagues. This may be especially important if a preceptor or other healthcare professional (e.g., physician) has conflicting cultural beliefs to a student and consequently, a different level of acceptance and confidence pertaining to the use of CM in practice. The impact of students' cultural beliefs on practice should therefore be an urgent priority for the educational research community.

This study provides a foundation for further research. First, the influence of students' cultural beliefs with respect to CM should be assessed within the practice environment and patient care settings. Determining if/how cultural values may influence the propensity for recommending a CM therapy, for example, could better direct educational interventions aimed at appropriately using these health interventions in practice and identifying patients that may benefit the most. Second, studies should attempt to determine how cultural beliefs might vary based on other demographics, such as country of origin, gender, or age. This homogenous sample in the present study precluded any further analysis based on these demographics. Application of cultural theory, such as cultural dimensions theory, may also allow for better understanding the influence of culture on CM perceptions and practice.<sup>17</sup> Future research should also explore the idea of cultural conflict between students (or pharmacists), patients, and interprofessional colleagues when working with CM therapies. This information may support development of interprofessional education directed towards managing and reducing cultural conflict in the workplace.

The findings of this study should be considered in light of some limitations. One author is the course coordinator for the 'Pharmacognosy Alternative/Complementary Treatments' course studied in this article and another author is the course coordinator for the evidence-based medicine course; this may have influenced responders. Furthermore, statistics were not adjusted for multiplicity, which could increase the risk of false positives. For this study, the scope of CM that was assessed was broad and students' perspectives may vary depending on which specific CAM methods are studied. This brings to light an area of future research as student perspectives may vary depending on different CAM approaches. Finally, these results are largely hypothesis generating and can only provide signals that cultural beliefs may impact eventual practice.

## Summary

Pharmacy students in the college of pharmacy at Qatar University demonstrated a positive attitude towards the use of CM, with culture playing an important role for their beliefs. These findings support the notion that curricular programming must account for diversity in students' culture and beliefs, especially in settings of high cultural diversity. Interactions between students' cultural beliefs and those of program administrators, academic staff, and preceptors, should be priorities for future research.

## Disclosure(s)

None.

## Author statement

Farhat Naz Hussain: conceptualization, methodology, formal analysis, investigation, writing – original draft, writing – review & editing, visualization. Daniel Rainkie: Methodology, software, validation, formal analysis, writing – original draft, writing – review & editing. Feras Alali: conceptualization, writing – review & editing. Kyle Wilby: conceptualization, methodology, formal analysis, investigation, writing – original draft, writing – review & editing, visualization, supervision.

## Declaration of Competing Interest

None.

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