RESEARCH

A Cross Sectional and Longitudinal Study of Pharmacy Student Perceptions of Readiness to Serve Diverse Populations

Stephanie Y. Crawford, PhD, MPH,^a Clara Awé, PhD, EdD,^a Rima H. Tawk, PhD,^b
A. Simon Pickard, PhD^a

^a University of Illinois at Chicago (UIC), College of Pharmacy, Chicago, Illinois

^b Florida Agricultural and Mechanical University, Tallahassee, Florida (affiliated with UIC College of Pharmacy at time of study)

Submitted March 19, 2015; accepted September 2, 2015; published May 25, 2016.

Objective. To examine students' self-perceptions at different stages in a pharmacy curriculum of competence related to serving culturally diverse patients and to compare self-reported competence of a student cohort near the beginning and end of the degree program.

Methods. Student perceptions across four pharmacy class years were measured in a cross-sectional survey, with a follow-up longitudinal survey of one cohort three years later.

Results. Based on an 81.9% response rate (537/656), scores showed no attitude changes. Reported knowledge, skills, comfort in clinical encounters, and curricular preparedness increased across program years. Fourth-year (P4) pharmacy students reported the highest scores. Scores differed by gender, age, and race/ethnicity. Students in the fourth year scored lower on importance of diversity training.

Conclusion. Improved perceptions of readiness (ie, knowledge and behavior) to serve diverse groups suggest the curriculum impacts these constructs, while the invariance of student attitudes and association of self-reports with programmatic outcomes warrant further investigation.

Keywords: cultural diversity; professional competence; curricular assessment; survey

INTRODUCTION

Increased emphasis on serving diverse patient populations is essential in pharmacy education to help patients achieve optimal outcomes.^{1,2} The Accreditation Council for Pharmacy Education (ACPE) Standards 2016 mandate that pharmacy curricula prepare students for provision of care to culturally diverse populations.³ Service to diverse patient groups includes recognition of social determinants of health and social group affiliations.⁴ Patient-centered, culturally-competent care to diverse groups encompasses tailored delivery of health care services (as needed) in consideration of patients' race and ethnicity, gender, sociocultural barriers, sexual orientation, nationality, geography, religion, age, language, ableism/disability, and health beliefs.^{2,5-10}

Conceptual frameworks identify self-assessment as the first step in any cultural competence process because of the importance of understanding one's own culture and the profession's culture.^{2,6,11-13} Wells' Cultural Development Model describes phases of individual progress along

the cognitive (knowledge and awareness) and affective (skills and behavior) continuum of culturally-appropriate care.¹⁴ Self-awareness of attitude toward serving diverse groups, adequate knowledge about different patient populations, and skill development are critical elements in educating health care professionals.^{5,12,15-18} For students in pharmacy and other health professions, variability exists in cultural competence across class years, gender, age, and/or race and ethnicity.^{17,19-23}

Existing or modified survey instruments²⁴⁻²⁸ and validated adaptations of combined instruments^{19,29,30} are used to measure cultural competence in pharmacy students. Most published assessments of cultural competence and diversity exposure in pharmacy education evaluate knowledge and/or attitudinal gains following development of innovative elective courses, didactic or experiential educational activities, or other pedagogical strategies.^{27,31-37} The need for pharmacy curricula to integrate cultural competence and engage students to serve diverse patients is well articulated.^{1,32,38-40}

The objectives of this study were to: (1) examine students' self-perceptions of competence related to serving culturally diverse patients at different stages in a pharmacy curriculum (ie, class year); and (2) compare self-perceptions

Corresponding Author: Stephanie Crawford, UIC
Department of Pharmacy Systems, Outcomes and Policy, 833
S. Wood St. (mc 871), Chicago, IL 60612. Tel: 312-413-1337.
Fax: 312-996-2954. E-mail: crawford@uic.edu

of cultural competence within a student cohort near the beginning and end of its degree program.

METHODS

Doctor of pharmacy (PharmD) students at the study institution were surveyed to determine perceptions of their knowledge, attitudes, skills, and comfort in clinical encounters with culturally diverse groups. Participants were also surveyed about the importance of diversity training and how well the curriculum prepared them to serve diverse patient groups.

Data were collected from professional students at the University of Illinois College of Pharmacy. American Indian/Native American, non-Hispanic Black or African American, and Hispanic/Latino students are considered underrepresented minorities (URM) at the study institution. Total URM class representation during study years (2009-2012) ranged from 9% to 13%. Non-Hispanic White Americans represented 42% to 52% of each class (depending on year), and Asians (as a collective group) composed 33% to 41% of pharmacy classes. When this study began, only the college's Chicago campus existed. Students first matriculated at the Rockford, Illinois branch campus in fall 2010 and graduated in 2014. Thus, Rockford-based pharmacy students were not included in the data collected for the study.

To help provide context, a brief description is provided on curricular content (at time of data collection and through year 2015) regarding cultural competence and serving diverse patient populations. The most extensive didactic exposure was via a series of lecture/discussions (six hours on patient empowerment and cultural considerations) during the first semester. The last hour in this series included in-class small group workshops where students were instructed to form groups of 4 to 5 reflecting cultural diversity. Student groups dialogued on a set of assigned questions. This was followed by discussion with the whole class, which included sharing students' cultural experiences (often based on religion, race/ethnicity, gender, and family structures). Student reflections were captured at the end of class with a written quiz where the students noted one thing they learned about themselves and one thing they learned about cultural diversity. Regular examination questions assessed other aspects of content from this lecture series. During this early curricular exposure, pharmacy students were taught about cultural awareness and the need for cultural sensitivity. Faculty members emphasized that acknowledging cultural differences did not imply that one must believe in or incorporate those differences into one's own belief system; rather, it implied a need to respect another's cultural values and suspend judgment of the values of the diverse population one serves.

Across the pharmacy curriculum, other didactic instruction addressed additional aspects of cultural competence and preparation to serve diverse populations. Review of course syllabi and March 2013 interviews with coordinators of core courses showed lectures on cultural awareness were dispersed throughout the curriculum without the concentrated emphasis students received their first semester. The curriculum covered patient-centered care, pharmacogenomics, complementary and alternative medicine, women's and men's health, and culture (eg, race/ethnicity, gender, age, geography, social class, nationality, disability, and religion). Effective cross-cultural communications was introduced, noting need to consider health literacy, health beliefs, and patient explanatory models. Within different courses, students were introduced to concepts of health status (eg, social determinants of health, disease prevalence and pharmacoepidemiology, health disparities and trends, and historical context). Instructional methods included lecture/discussion, videos, recitations, aspects of case studies, simulations, among others.

Knowledge was primarily assessed through examinations, written assignments, patient plans, and portions of case study evaluation, but rarely was the topic of patient diversity the sole area of evaluation after the first semester. For knowledge and skills development, the curriculum offered sustained exposure and hands-on experience in working with diverse patients most prominently through experiential education. The racial/ethnic and cultural diversity of greater Chicago, coupled with the availability of numerous experiential sites, afforded extensive opportunity for students to learn about providing pharmacy services and care to diverse patient populations, especially during fourth-year advanced pharmacy practice experiences (APPEs).

A cross-sectional survey was conducted in late April through early May 2009 to assess pharmacy student perceptions across all four professional years (ie, classes of 2009, 2010, 2011, and 2012). The class of 2012 cohort was resurveyed three years later, weeks before their graduation to compare findings from their first year and to compare results from the class of 2009 graduates. The survey instrument was designed to compare constructs related to cultural competence across subgroups based on years of educational experience in pharmacy school, race, and ethnicity. The longitudinal analysis for one cohort compared each cultural competence domain near the end of their first and fourth pharmacy school years. All survey administrations occurred during 15 minutes of set-aside class time. Survey participation was voluntary, and data were collected anonymously. Research protocols were approved by the campus institutional review board.

With permission, we adapted a version of the Clinical Cultural Competency Questionnaire (CCCQ). Response choices were based on a 5-point scale (1=not at all, 2=a little, 3=somewhat, 4=quite a bit, 5=very). The survey instrument for the modified CCCQ (ie, mCCCQ) consisted of a section for student demographic information, 57 items (used verbatim or adapted as indicated) from the CCCQ, and two single-item scales. Items related to the mCCCQ “Attitudes” scale included divergent content, which suggested three attitudinal subscales should be formed: (1) attitude – health disparities: importance of listed variables in contributing to health disparities, including illiteracy, homophobia, educational status, poverty, environment, genetics, ageism, sexism, racism, classism (social class), ableism (disability), and lifestyle; (2) attitude – sociocultural: importance of sociocultural issues in interactions with patients, pharmacy students, pharmacy staff, and other health professions colleagues; and (3) attitude – self-awareness: awareness of one’s own racial, ethnic, or cultural identity; racial, ethnic, or cultural stereotypes, biases, and prejudices.

The knowledge scale ascertained self-assessed knowledge about sociocultural characteristics of diverse groups, health risks and disparities, ethnopharmacology, different healing traditions, impact of discrimination in health care, and population-specific topics.

In measuring skills, the mCCCQ included items describing how skilled the student was in dealing with sociocultural issues in various patient care areas, such as greeting patients in culturally sensitive manner, eliciting patient perspectives on health and illness, providing dosage form alternatives to patients because of religious affiliations (adapted item), recommending treatment alternatives associated with racial/ethnic differences in drug metabolism (adapted), assessing patients’ health literacy, working with medical interpreters, and dealing with adherence problems for cross-cultural populations.

Last, the mCCCQ included items on respondent comfort level with listed cross-cultural *encounters* or situations, such as caring (eg, for patients from culturally diverse backgrounds, those with limited English proficiency, patients using folk healers or alternative therapies), attentiveness to culturally-specific nonverbal cues, advising patient to change cultural behaviors or practices that impair health, and working with health professionals from diverse backgrounds.

Most survey instrument adaptations involved switching physician terminology references to those of pharmacists. The mCCCQ included domains of cultural competence related to self-reported attitudes (three subscales), knowledge, skills, and clinical encounter comfort similar to the original questionnaire. We also

adapted an item to determine student perceptions of the importance of pharmacists receiving training in cultural diversity and/or multicultural health care and added an item on how well the curriculum prepared the student to serve culturally diverse patient populations. Remaining CCCQ items that did not seem relevant to pharmacy education were omitted.

Some scales had missing data as a result of item non-response. These were included using simple mean imputation if at least half of the items on the scale were completed. If less than 50% of the items were completed, no imputation was made and the domain scores were considered missing. In scoring each of the scales, we used a summated score approach. Item responses were added to get a raw score, then the score transformed to a scale of 0 to 100 by dividing the observed score minus the minimum score by the scale range (ie, maximum minus minimum, and multiplying by 100).

In the cross-sectional analysis, differences in respondent characteristics were examined using chi-square tests. Summated scales were assessed for internal consistency reliability using Cronbach alpha. Reliability was also examined using inter-item correlations. Differences in domain mean scores among mean scores for three or more groups were analyzed using one-way analysis of variance (ANOVA), and Scheffe post hoc tests identified which specific subgroup means differed from each other. When the ANOVA demonstrated an overall difference between groups, the Scheffe test enabled comparison of individual group differences so the likelihood of a type 1 error was not inflated. In the longitudinal analysis, *t* tests examined changes in the cohort between the first (P1) year (2009) and fourth (P4) year (2012). As data were collected anonymously, it was not possible to use paired samples between the measures. Independent *t* tests also compared values between P4s graduating in 2009 and those graduating in 2012. A mean difference score of half a standard deviation or more is considered meaningful in health measurement,^{41,42} and this rule of thumb was used to interpret findings. Data were analyzed using SPSS, v22 (IBM, Armonk, NY). All *p* values were interpreted as significant based on an alpha level of 0.05.

RESULTS

The overall response rate in spring 2009 was 81.9% (537/656). Response rates were based on total number of students enrolled rather than availability on survey administration dates. Scale reliabilities are listed in Table 1.

Respondents per class were P1 (151/160, 94.4%), second-year (P2) (103/163, 63.2%), third-year (P3) (146 /168, 86.9%), and P4 students (137/165, 83.0%). Table 2 shows the majority of respondents were women

Table 1. Reliabilities of Scales for the Modified Clinical Cultural Competency Questionnaire (mCCCQ)

Scale	No. of Items	Cronbach Alpha	Mean Inter-item Correlations	Range of Inter-item Correlations
Attitude – Health Disparities	12	0.87	0.36	0.16-0.65
Attitude – Sociocultural	4	0.92	0.73	0.56-0.90
Attitude – Self-Awareness	3	0.90	0.74	0.64-0.83
Knowledge	15	0.94	0.49	0.27-0.86
Skills	14	0.94	0.51	0.24-0.84
Comfort – Clinical Encounters	9	0.87	0.43	0.15-0.75

(64%), 30 years old or younger (90%), and White (52%). Reflective of the student body, a relatively small percentage were Black, Hispanic, American Indian or other, which necessitated combining these groups (as URMs) for data analysis. There were no significant differences in respondents' demographic characteristics across year of pharmacy program (χ^2 tests, all p values >0.05).

Scale values by pharmacy class year are shown in Table 3. Scale scores could not be computed because more than 50% of items were missing for a small proportion of respondents, ranging from 0.6% for the attitude – self-awareness scale ($n=3/537$) to 5.4% for attitude – health disparities ($n=29/537$). When $>50\%$ of the items were complete, imputation was conducted to the following extent: attitude – health disparities, $n=25$; attitude – sociocultural, $n=0$ (no imputation); attitude – self-awareness, $n=1$; knowledge, $n=6$; skills, $n=10$; and comfort – clinical encounters, $n=3$. In comparing cultural competence perceptions across program year, no difference were found in

attitudes, but differences existed in perceptions of knowledge, skills, comfort in clinical encounters, and how well the curriculum prepared students (Table 3).

The P4 class had higher mean scores ($p<0.001$) than respondents from other program years on scales for knowledge, skills, and comfort in clinical encounters. While scores on perceived importance of pharmacist training on diversity and multicultural health care were above 75% each class year, they declined slightly each progressive year in the pharmacy degree program ($p=0.03$, data missing for three cases); post hoc comparisons did not identify subgroup differences. Students in P1 and P4 classes, near the beginning and end of their degree program, reported higher ratings than P2 and P3 classes in terms of how well they believed the college's pharmacy curriculum prepared them to serve culturally diverse patient populations. For this variable, curriculum prepared well, P1 scores were higher than P2 scores, and P4 scores were higher than scores for P2 and P3 students (missing data for three cases).

Table 2. Baseline Characteristics of 2009 Respondents by Pharmacy Class Year^a

Characteristic	n (%)				
	P1 (N=151)	P2 (N=103)	P3 (N=146)	P4 (N=137)	Total (N=537)
Gender					
Male	64 (43)	31 (30)	50 (34)	46 (34)	191 (36)
Female	86 (57)	72 (70)	95 (66)	91 (66)	344 (64)
Age					
21-25	101 (70)	63 (62)	53 (39)	31 (23)	248 (48)
26-30	30 (21)	26 (25)	71 (51)	90 (66)	217 (42)
31-49	13 (9)	13 (13)	14 (10)	15 (11)	55 (10)
Race/Ethnicity					
White (non-Hispanic)	83 (56)	51 (49)	72 (50)	73 (54)	279 (52)
Underrepresented minorities ^b	18 (12)	13 (13)	21 (14)	11 (8)	63 (12)
Asian	36 (24)	29 (28)	42 (29)	47 (34)	154 (29)
Other	12 (8)	10 (10)	10 (7)	5 (4)	37 (7)
Speak language other than English					
Yes	82 (55)	59 (57)	83 (58)	75 (55)	299 (56)
No	68 (45)	44 (43)	61 (42)	62 (45%)	235 (44)

^aTotal may not equal sum of N across years because of nonresponse to some items

^bUnderrepresented minorities include non-Hispanic Black or African American, Hispanic, American Indian/Native American, and other (identified with more than one race)

P1=first professional year; P2=second professional year; P3=third professional year; P4=fourth professional year

Table 3. Baseline Scale and Item Measures by Pharmacy Class Year

	Total (N=531 to 535 ^a)	P1 (n=150)	P2 (n=103)	P3 (n=145)	P4 (n=137)		
Scale	Mean (SD)					F	p value ^b
Attitude – Health Disparities	66.4 (17.3)	67.3 (15.7)	66.7 (16.1)	65.5 (17.8)	66.1 (19.2)	0.3	0.85
Attitude – Sociocultural	68.4 (25.0)	70.9 (24.1)	71.6 (21.6)	66.1 (26.3)	65.7 (26.6)	2.0	0.11
Attitude – Self-Awareness	77.5 (22.6)	76.9 (24.6)	78.4 (21.3)	77.9 (22.3)	76.9 (21.8)	0.1	0.94
Knowledge	53.6 (16.9)	50.0 (16.7)	51.2 (15.3)	53.1 (16.4)	59.9 (17.0)	9.9	<0.01 ^c
Skills	49.1 (20.1)	43.7 (20.9)	44.2 (18.3)	47.5 (17.3)	60.5 (19.0)	23.0	<0.01 ^d
Comfort – Clinical Encounters	53.5 (19.4)	52.7 (21.5)	49.7 (17.1)	51.2 (18.3)	59.6 (18.3)	6.7	<0.01 ^e
Diversity training importance	79.3 (23.3)	83.7 (20.1)	79.9 (22.4)	77.1 (24.1)	76.5 (25.0)	2.9	0.03
Curriculum Prepared Well	59.7 (24.7)	63.9 (22.7)	48.8 (25.8)	57.3 (24.2)	65.9 (24.7)	12.2	<0.01 ^f

P1=first professional year; P2=second professional year; P3=third professional year; P4=fourth professional year

^aResponse range

^bp-value based on ANOVA

^cScheffe post hoc comparisons demonstrated knowledge scores for P1s, P2s and P3s differed from P4s ($p<0.05$)

^dScheffe comparisons demonstrated skills scores for P1s, P2s and P3s differed from P4s ($p<0.05$)

^eScheffe comparisons demonstrated comfort in clinical encounters scores for P1s, P2s and P3s differed from P4s ($p<0.05$)

^fScheffe comparisons for scores on how well the curriculum prepared demonstrated P1s differed from P2s; P2s and P3s differed from P4s; ($p<0.05$)

Subgroup analysis identified differences in mean (SD) subscale scores according to gender. Women scored higher on the attitude subscale for variables contributing to health disparities [women 68.4 (15.7), men 63.1 (18.9), $p=0.001$] and importance of training on diversity (women 81.8 (20.6), men 74.7 (27.0), $p=0.001$). Men had significantly higher scores related to comfort in clinical encounters with diverse groups [women 52.2 (19.1), men 56.0 (19.5), $p=0.03$]. When scores were examined by race/ethnicity, significant differences were observed related to cultural competence attitudes, knowledge, diversity training, and curricular

preparedness, but not for skills or comfort in clinical encounters (Table 4).

Attitude scores for all three subscales differed among Asian and White students, and sociocultural attitudes also differed between underrepresented minorities and White students. Perceived knowledge of culturally diverse subject areas was greater for URMs than their Asian peers. Scheffe comparisons did not identify subgroup differences in perceptions of curriculum preparedness. Finally, scores on the importance of diversity training were higher for URMs than for White students, and higher for Asian students than for White students.

Table 4. Baseline Scores by Race and Ethnicity

Scale	Mean (SD)			F	p value ^b
	Under-represented minorities ^a (n=63)	Asian (n=154)	White (n=279)		
Attitude – Health Disparities	68.6 (19.6)	68.4 (15.0)	64.1 (17.4)	3.9	0.02 ^c
Attitude – Sociocultural	75.3 (23.4)	71.2 (23.0)	64.2 (26.2)	7.2	<0.01 ^d
Attitude – Self-Awareness	80.6 (24.8)	80.5 (19.4)	74.4 (23.1)	4.6	0.01 ^e
Knowledge	58.0 (17.2)	51.4 (16.2)	53.3 (17.2)	3.4	0.03 ^f
Skills	51.6 (19.9)	48.0 (19.1)	48.6 (20.7)	0.7	0.48
Comfort – Clinical Encounters	56.3 (16.8)	53.8 (19.6)	51.8 (19.9)	1.6	0.20
Diversity training importance	88.5 (19.0)	81.8 (20.7)	74.3 (25.2)	12.1	<0.01 ^g
Curriculum prepared well	55.2 (24.7)	63.6 (25.6)	58.0 (23.6)	3.7	0.03

^aUnderrepresented minorities (URMs) include non-Hispanic Black or African American, Hispanic, American Indian/Native American, and other (identified with more than one race)

^bp-value based on ANOVA

^cScheffe post hoc comparisons demonstrated 'attitude: health disparities' scores for Asian students differed from White students ($p<0.05$)

^dScheffe comparisons demonstrated 'attitude: sociocultural' scores for URM and Asian students differed from White students ($p<0.05$)

^eScheffe comparisons on 'attitude: self-awareness' demonstrated scores for Asian students differed from White students ($p<0.05$)

^fScheffe comparisons on knowledge demonstrated scores for URM students differed from Asian students ($p<0.05$)

^gScheffe comparisons on the importance of diversity training demonstrated scores for URM and Asian students differed from White students ($p<0.05$)

Age differences were found in reported scores on self-awareness of cultural identity among pharmacy students 21-25 years old [score 80.0 (20.3)] compared to students older than 30 [70.2 (27.6), $p=0.011$]. Differences were also demonstrated in self-reported cultural knowledge between 21-25 year olds [50.3 (16.5)] and 26-30 year olds [58.0 (16.6), $p<0.001$], and skills, with 21-25 year olds scoring 46.6 (19.9) and 26-30 year olds scoring 52.6 (20.1, $p=0.006$].

One hundred twenty-four out of 160 (77.5%) P4s from the class of 2012 cohort completed the repeated survey in April 2012. Chi-square analyses showed no differences in gender, race/ethnicity, or proportional age groups in the respondent cohort from 2009 to 2012 (all p values >0.05). Scale scores could not be computed because more than 50% of items were missing for a small proportion of respondents, ranging from 0% (for the attitude – self-awareness and comfort – clinical encounters scales) to 3.2% ($n=4/124$ for the knowledge scale). When $>50\%$ of the items were complete, imputation was conducted only for the knowledge scale, $n=2$. No imputation of missing values was needed for the other five scales.

Results from longitudinal analysis showed no differences ($p>0.05$) between P1 and P4 measures for the class of 2012 cohort with respect to attitudes on health disparities and attitudes about self-awareness. Differences were found in sociocultural attitudes ($p=0.028$), with the 2012 P4s showing a lower mean (SD) of 63.6 (29.4) [compared with earlier P1 cohort score of 70.9 (24.1)]. This was the only group comparison that differed from the 2009 comparative results between P1s and P4s. Similar to findings in the cross-sectional analysis for the P1 cohort (Table 3), perceptions of cultural competence knowledge ($p<0.001$), skills ($p<0.001$), and clinical encounters comfort ($p=0.012$) were consistently higher for P4s in the longitudinal analysis with respective mean (SD) values of 58.5 (15.0), 56.1 (19.4), and 59.0 (18.9). Based on the full cohort sample ($n=124$), no differences ($p>0.05$) were found in longitudinal analyses on the single-item variables on the importance of diversity training and how well the curriculum prepared students. Finally, when comparing the two P4 groups only (ie, graduating seniors in 2009 and 2012), no differences were found in any reported cultural competence or diversity measures ($p>0.05$).

The pattern demonstrated strong consistency of results in comparisons between P1s and P4s and stability of P4 measures at both time points. To summarize, for the class of 2012 cohort, sociocultural attitude scores were lower for graduating students compared with their scores during the first year in pharmacy school. All other findings showed consistent comparative results. Scores for P1s differed from P4s in the cross-sectional and longitudinal

survey in reported knowledge, skills, and comfort in clinical encounters. Neither survey demonstrated differences between P1s and P4s in health disparities attitudes, self-awareness attitudes, importance of diversity training, and curricular preparedness. Findings were consistent across all domains with no differences demonstrated between scores of P4s in the different graduating cohorts.

DISCUSSION

Knowledge and cultural awareness are needed to provide culturally sensitive pharmacy practice.² Student attitudes did not differ when comparing cultural competence perceptions across pharmacy program year at baseline. It is unknown how attitudes were impacted by curricular content. Further, the importance of invariant attitudes was unclear relative to increased perceived knowledge, skills in dealing with sociocultural issues, and comfort in readiness to serve diverse populations. Through awareness of one's own culture and biases, however, health care professionals are better prepared to promote behavioral changes needed to avoid undue influence of their personal attitudes on care provision.¹³ Students are instructed on the need for culturally responsive care at the study institution. Faculty members do not attempt to change students' attitudes toward one way of thinking. Pharmacy students are taught to respect the beliefs, attitudes, and behaviors of those who differ from them. This is accomplished, in part, by faculty members modeling respectful behavior toward students' beliefs and attitudes.

Findings of differences in attitudinal domains and the knowledge domain across racial/ethnic groups were not considered meaningful based on the criterion used (ie, difference of at least one-half the SD). A meaningful difference was shown in scores on the importance of diversity training, with underrepresented minorities scoring higher on this than White students. Echeverri and colleagues discussed reasons why some perceptions differ among African Americans, Asians, and Whites.¹⁹ Our study used different measures and groupings (eg, inclusion of Latino and American Indian students along with African Americans as a combined group of URM). Nevertheless, faculty members should keep in mind that students possess different sensitivities and experiences, which affect perceptions of competence in interacting effectively with people who differ from them.

Scores for P1s and P4s were higher than P2 and P3 students in perceptions of how well the curriculum prepared them to serve diverse groups. Studies in other disciplines also show first-year students may demonstrate higher scores in some perceived dimensions of cultural competence.^{43,44} Currently at the study institution, more structured and overt content on issues of cultural

awareness and cultural sensitivity is provided during the first professional year, including pedagogies of culturally relevant teaching (ie, use of students' culture[s] as a means to enhance learning⁴⁵). It is possible that scores on this domain decreased in the P2 and P3 years as pharmacy students gained more experience and realization of what they did and did not know regarding serving diverse patients. The most in-depth and sustained exposure to diverse patient groups is offered during the APPEs for P4s.

Our study revealed differences in cross-sectional perceptions of knowledge, skills, and comfort in multicultural clinical encounters, which were highest for students in the P4 year. Longitudinal analysis of the same cohort of students in P1 and P4 years found a similar pattern, where perceptions of cultural competence improved in terms of knowledge, skills, and clinical encounters comfort. This finding may suggest evidence of successful attainment of desired educational outcomes through didactic and experiential learning. Echeverri and colleagues showed senior pharmacy students perceived higher competence in cultural issues when looking across all four class years and concluded P3s had lower means than P4s based on instructional methods.¹⁹ Our study provided comparisons in a different setting and described the stability of the findings in cross-sectional and longitudinal study.

Longitudinal analyses strongly supported findings from the cross-sectional survey in our study. This stability of findings has implications for curricular assessment in PharmD programs. Rindfleisch and colleagues noted that findings from cross-sectional data may have comparable validity to longitudinal data in some circumstances.⁴⁶ Cross-sectional survey results may be sufficient in program assessment and plans, especially if no changes in processes have occurred over time. Our study found similarities in response patterns of P4 students (ie, graduating classes of 2009 and 2012). As the graduating seniors in the classes of 2009 and 2012 showed no significant differences in scores across all scales, the validity of the constructs measured is supported with respect to students' perceived readiness to serve diverse populations.

One attitudinal subscale (ie, sociocultural attitudes) showed perplexing findings. At the cross-sectional baseline in 2009, P4 sociocultural attitudes values trended downward, and differences were significant between P1s and P4s for the class of 2012 cohort. This domain asked how important students believed sociocultural issues were in interactions with patients, pharmacy students, pharmacy staff, and other health professions colleagues. We do not know the reasons why P4 students tended to perceive less importance of sociocultural issues

in interactions with different groups, and this issue merits further research.

A similar downward trend (though not significant) was shown between P1s and P4s in Echeverri et al's study of pharmacy students at Xavier University of Louisiana.¹⁹ VanZant's cross-sectional study using the CCCQ reported first-year medical students at Wright State University showed higher mean attitude scores (as one domain) compared to fourth-year medical students (normed scores 81.4 and 55.7, respectively).⁴⁷ Crandall et al's somewhat analogous study found pharmacy students' attitude scores toward medically underserved patients were unchanged in a longitudinal cohort survey of students at two southern universities in their first and fourth years of pharmacy school.²² Yet, medical students' attitude scores declined with respect to caring for the medically underserved. The authors' explanation was that as those students progressed through the medical program, they encountered less idealism and increased awareness of challenges of the health care system.²²

On the other hand, stereotyping is typically avoided in cultural development. Patients should be seen as individuals without assuming differences are a result of behaviors within cultural groups.¹⁴ Perhaps our study's pharmacy students ascribed lower importance to sociocultural issues because of their views of patient-focused care and individualism, rather than interactions with members of like groups.

Student populations in schools of pharmacy may not be representative of the patient population served. Moreover, while Asians are not considered to be underrepresented in pharmacy schools, Asians could be considered minorities in other classifications, such as patients. Regardless of racial or ethnic group (or other demographic characteristics), health care providers may face similar challenges interacting with individuals from groups different than theirs.⁴⁸ The process of becoming competent to serve patients who look, think, and act differently from oneself is ongoing and achieved via repeated engagement with diverse patients as well as increasing ability and awareness on the part of the practitioner.⁴⁹ Per ACPE Standards, pharmacy degree programs must provide adequate knowledge and exposure opportunities for students to demonstrate these performance competencies.³

While our findings suggested a positive impact of the learning environment on pharmacy students' knowledge, skills, and comfort in clinical encounters, the magnitude of the cultural competence scores (on a 0-100 scale) show the need for continuing efforts and lifelong learning to gain increased proficiency. Pharmacy students' mean scores for the importance of diversity training was relatively high, but decreased across subsequent class years.

Without repeated curricular assessments, students may not have perceived the importance of multiculturalism, as Lypson et al found in a focus group study on medical education.⁵⁰

Student self-assessment represents one component of broad assessment efforts used for continual improvement of the curriculum and educational outcomes. Awareness of one's own personal culture, attitudes, and behaviors in cultural competence may not represent actual or observed abilities, but is an important initial step.^{2,12-14,51} Bandura's self-efficacy theory posits that individuals must have confidence and belief in their own capabilities to perform the tasks needed to achieve desired results.⁵² As students may overestimate their level of cultural competence,⁵³ comparing student perceptions with assessment data of student performance from curricular content would strengthen the impact of current findings in terms of curricular effectiveness. Such data, however, were unavailable for inclusion in this study. Thus, a limitation of this study is a lack of ability to relate the self-evaluation of cultural competency to the performance/demonstration of cultural competence. This is an avenue for future research. However, the present study does expand the literature on new methods and measures by offering an approach and structure for self-assessment of cultural competence in pharmacy with evidence to support the validity of the measure.

Programmatic assessment is needed to collect and analyze data on student performance (per course objectives) to determine how well student perceptions match with observed knowledge and skills. Within the current methods of student assessment (eg, case studies, written patient plans, examination questions, simulated patient scenarios), faculty members are encouraged to ascertain how students demonstrate knowledge and/or skills in culture-related content as an important aspect of patient-centered care. Students should document cultural competence events experienced during introductory pharmacy practice experiences (IPPEs) and APPEs.²⁶⁻²⁸

The professional pharmacy curriculum is under revision at the study institution, with planned implementation of a new curriculum beginning fall semester 2016. Our findings were considered as one aspect of curricular assessment and reform to build on the hidden curriculum, address gaps with respect to cultural and diversity issues, and plan programs for faculty development. Other planned assessment activities include curriculum mapping, faculty interviews, and student focus groups. In addition to survey results, objective measures are needed to gauge curricular effectiveness in cultural competence and readiness to serve diverse populations.

Mean scores for our pharmacy students ranged from 60-66% on whether the curriculum prepared them well to serve diverse patient populations. Such findings, coupled with programmatic assessment, may suggest the need to develop more effective instructional strategies to address student perceptions. For example, other studies found students from different racial or ethnic groups reported varying levels competence to provide culturally appropriate care.^{17,19} Mean differences in scores were found based on gender and age in our study, similar to findings for medical students.^{20,21} While the differences were significant, they may be interpreted as marginal in terms of an important difference (ie, less than 0.5 SD). If this represents an important difference, then it suggests males lag behind female counterparts in terms of real or perceived cultural competence and may be an area of focus when developing instructional strategies.

Limitations of the method should be considered in interpreting study results. Further research is needed to link perceived knowledge, skills, and behaviors with assessed student performance, and student maturation over the years is not a variable we could measure. While the student and patient population for the study institution is relatively diverse, data were collected at one college of pharmacy; thus, results may not be generalizable to other settings. This study examined individual self-assessment on knowledge, attitudes, and skills. We recommend that further research also investigate contextual factors,^{48,54} which would include the settings of institution and experiential sites with consideration of how organizational factors may hinder or contribute to individual awareness and exposure to diverse patient groups. The majority of students at the study institution participated in the study, with more than 75% of students in each year of the PharmD program responding except for the P2 class. Their lower response rate was likely a result of survey administration following a 10-minute break on last day of class for the academic year. Nevertheless, the sample size is among the largest reported among known studies evaluating the perceived cultural competence and diversity exposure of pharmacy or other health professions students.

Results indicated high internal consistency reliability with Cronbach alpha values ranging from 0.87 to 0.94 for the six multi-item scales. In examining the inter-item correlations, values on scale less than 0.30 suggest that some items did not work well on certain scales, and items with inter-item correlations greater than 0.70 may have been redundant. Generally, the instrument functioned well as most items fell within the acceptable range of 0.30-0.70 for their respective scales. However, further analysis into the properties of the measure and modification of the

instrument is an avenue for further research, and instrument refinement, such as item functioning along the continuum of each dimension, would complement the classical test theory-based analysis presented here.

Our results demonstrated adapted use of a survey instrument with high reliability and a strengthened method with consistency in cross-sectional and longitudinal findings. The methods and findings can benefit others who are examining ways to assess student readiness to serve diverse patients. Self-assessment can help identify gaps in diversity education and experiences, which may help inform needed programmatic changes. In this study, perceptions across student cohorts demonstrated clear patterns even though the actual level of performance was not established. While survey research is limited in the ability to home in on specific aspects of the curriculum, self-reported data can complement other sources of assessment data (eg, objective performance measures, written self-reflection, focus groups or interviews, and other in-depth data sources).

Survey findings such as ours should be viewed as an opportunity to dialogue on student views, curricular coverage, and needs for faculty development in teaching multicultural care.⁵⁵ If schools of pharmacy, including the study institution, accept that preparing pharmacy students to serve diverse patient populations is essential in pharmacy education, this should be considered as a terminal competency for graduates. School-wide efforts could be centralized to assess how curricular content and organizational culture can address student knowledge, attitudes, and skills. A strategic approach seems necessary as a simple solution is not apparent. Different assessment techniques are needed as student skill sets develop across years.

About 25% of pharmacy schools have branch campuses and student exposures and experiences with actual patients may differ across settings with distance education. Regardless, all student pharmacists will encounter patients who are different from themselves throughout pharmacy school and in practice. Periodic diagnostic assessment will help to gauge student readiness, and findings can help devise strategies to help begin to bridge deficiencies.

In 2007, Onyoni and Ives reported survey results from 54 curriculum chairs at schools of pharmacy, and the majority expressed high interest and need for increased curricular content and faculty development on cultural competence.¹ Different educational programs in the health professions teach concepts related to serving diverse groups, and the number of faculty members with expertise in cross-cultural clinical practice may be insufficient in health professions schools.⁵⁶ It seems important

to use an organized framework for teaching and assessing students' level of multicultural knowledge and care provision.

To supplement efforts by individual research teams and move the needle forward in assessing pharmacy student readiness to serve diverse populations, we recommend a multi-institutional approach. We hope an expert group will facilitate such efforts, such as members of the American Association of Colleges of Pharmacy (AACP) Health Disparities and Cultural Competence Special Interest Group (SIG) with interest and research expertise in this area. Perhaps our findings, coupled with the extant literature, could be used by leaders in the academy to develop and recommend minimal standards for competence that should be demonstrated by all graduating pharmacy students.

Efforts could also develop best practice for integration across the curriculum in addition to planned modules and elective course work and areas for faculty development,⁵⁶ including affiliated faculty preceptors. Multi-institutional investigators could work collaboratively in developing an assessment tool with the potential to be used as a widely-accepted standard. This would include consideration of a reasonable length of the measurement tool (ie, number of items) and establishment of psychometric properties — possibly including concurrent validity with standardized measures of student performance at several schools of pharmacy.

Perhaps more germane, subsequent efforts could determine how student perceptions of greater or lesser knowledge and skills in interacting with diverse patient groups translate into actual performance (not just simulated performance or knowledge testing). It is unknown how findings translate in the ability to provide culturally appropriate, high-quality care to diverse patient groups (eg, racial/ethnic, linguistic, religious, sexual orientation, cultural).⁵⁷ Such considerations are added to our recommendations for future research.

CONCLUSION

Development of competence in serving culturally diverse patient populations is an ongoing process throughout pharmacy education and in professional practice. Based on cross-sectional and longitudinal data, scores increased across class years, with fourth-year pharmacy students reporting the highest scores. Results indicate a positive curricular impact on students' readiness to serve diverse patient groups in terms of perceived gains in knowledge, skills, and comfort in clinical encounters. To compare reality to perceptions, however, findings would be strengthened by linking student performance from educational outcomes in didactic and experiential education to measures

of readiness to serve diverse populations. This is recommended as an area of future research among multi-institutional collaborators.

ACKNOWLEDGMENTS

This survey instrument used was adapted with permission from the Clinical Cultural Competency Questionnaire (CCCQ) developed by Robert C. Like, MD, MS, Professor and Director of the Center for Healthy Families and Cultural Diversity, Department of Family Medicine, UMDNJ-Robert Wood Johnson Medical School. The CCCQ was used in a project titled, "Assessing the Impact of Cultural Competency Training Using Participatory Quality Improvement Methods," funded by the Aetna Foundation (http://www2.umdnj.edu/fmedweb/chfcd/aetna_foundation.htm).

The original CCCQ (pretraining version) is available at: http://rwjms.umdnj.edu/departments_institutes/family_medicine/chfcd/grants_projects/documents/Pretraining.pdf.

The efforts of Ketsya Amboise Gordon, PharmD, are acknowledged in data collection and entry.

REFERENCES

- Onyoni EM, Ives TJ. Assessing implementation of cultural competency content in the curricula of colleges of pharmacy in the United States and Canada. *Am J Pharm Educ.* 2007;71(2):Article 24.
- O'Connell MB, Korner EJ, Rickles NM, Sias JJ. Cultural competence in health care and its implications for pharmacy. Part 1. Overview of key concepts in multicultural health care. *Pharmacotherapy.* 2007;27(7):1062-1079.
- Accreditation Council for Pharmacy Education. Accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree. Standards 2016. <https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf>. Accessed Aug 14, 2015.
- Nkansah NT, Youmans SL, Agness CF, Assemi M. Fostering and managing diversity in schools of pharmacy. *Am J Pharm Educ.* 2009;73(8):Article 152.
- Betancourt JR, Green AR, Carrillo JE, Ananeh-Firempong II O. Defining cultural competence: a practical framework for addressing racial/ethnic disparities in health and health care. *Public Health Rep.* 2003;118(4):293-302.
- Cross TL, Bazron BJ, Dennis KW, Isaacs MR. Towards a culturally competent system of care: a monograph on effective services for minority children who are severely emotionally disturbed, Vol 1. Washington, DC: Georgetown University, Child Development Center;1989.
- Lavizzo-Mourey R, Mackenzie ER. Cultural competence: essential measurements of quality for managed care organizations. *Ann Intern Med.* 1996;124(10):919-921.
- Betancourt JR. Cultural competence and medical education: many names, many perspectives, one goal. *Acad Med.* 2006;81(6):499-501.
- Betancourt JR, Green AR, Carrillo JE. Cultural competence in health care: emerging frameworks and practical approaches. 2002. http://www.commonwealthfund.org/~media/Files/Publications/Fund%20Report/2002/Oct/Cultural%20Competence%20in%20Health%20Care%20%20Emerging%20Frameworks%20and%20Practical%20Approaches/betancourt_culturalcompetence_576%20pdf.pdf. Accessed Mar 6, 2015.
- Smith WT, Roth JJ, Okoro O, Kimberlin C, Odedina FT. Disability in cultural competency pharmacy education. *Am J Pharm Educ.* 2011;75(2):Article 26.
- Anderson LM, Scrimshaw SC, Fullilove MT, Fielding JE, Normand J. Culturally competent healthcare systems. A systematic review. *Am J Prev Med.* 2003;24(3S):68-79.
- Brach C, Fraserirector I. Can cultural competency reduce racial and ethnic health disparities? A review and conceptual model. *Med Care Res Rev.* 2000;57(SI):181-217.
- Purnell L. The Purnell Model for Cultural Competence. *J Transcult Nurs.* 2002;13(3):193-196; 200-201.
- Wells MI. Beyond cultural competence: a model for individual and institutional cultural development. *J Community Health Nurs.* 2000;17(4):189-199.
- Eisenberg JM. Sociologic influences on decision-making by clinicians. *Ann Intern Med.* 1979;90(6):957-964.
- Smedley BD, Stith AY, Nelson AR. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Institute of Medicine of the National Academies, Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. Washington, DC: The National Academies Press; 2003: http://www.nap.edu/openbook.php?record_id=12875&page=R1.
- White-Means S, Zhiyong D, Hufstader M, Brown LT. Cultural competency, race, and skin tone bias among pharmacy, nursing, and medical students: implications for addressing health disparities. *Med Care Res Rev.* 2009;66(4):436-455.
- Campinha-Bacote J. The process of cultural competence in the delivery of healthcare services: a model of care. *J Transcult Nurs.* 2002;13(3):181-184;200-201.
- Echeverri M, Brookover C, Kennedy K. Assessing pharmacy students' self-perception of cultural competence. *J Health Care Poor Underserved.* 2013;24(1S):64-92.
- Ladson GM, Lin JM, Flores A, Magrane D. An assessment of cultural competence of first- and second-year medical students at a historically diverse medical school. *Am J Obstet Gynecol.* 2006; 195(5):1457-1462.
- Robins LS, Alexander GL, Wolf FM, Fantone JC, Davis WK. Development and evaluation of an instrument to assess medical students' cultural attitudes. *J Am Med Womens Assoc.* 1998;53(3S):124-127.
- Crandall SJ, Davis SW, Broeseker AE, Hildebrandt C. A longitudinal comparison of pharmacy and medical students' attitudes toward the medically underserved. *Am J Pharm Educ.* 2009;72(6): Article 148.
- Okoro ON, Odedina FT, Reams RR, Smith WT. Clinical cultural competency and knowledge of health disparities among pharmacy students. *Am J Pharm Educ.* 2012;76(3):Article 40.
- Poirier TI, Butler LM, Devraj R, Gupchup GV, Santanello C, Lynch JC. A cultural competency course for pharmacy students. *Am J Pharm Educ.* 2009;73(5):Article 81.
- Cooper LA, Vellurattil RP, Quinones-Boex A. Pharmacy students' perceptions of cultural competence encounters during practice experiences. *Am J Pharm Educ.* 2014;78(2):31.
- Haack S, Phillips C. Teaching cultural competency through a pharmacy skills and applications course series. *Am J Pharm Educ.* 2012;76(2):Article 27.
- Muzumdar JM, Holiday-Goodman M, Black C, Powers M. Cultural competence knowledge and confidence after classroom activities. *Am J Pharm Educ.* 2010;74(8):Article 150.

28. Vyas D, Caligiuri FJ. Reinforcing cultural competency concepts during introductory pharmacy practice experiences. *Am J Pharm Educ.* 2010;74(7):Article 129.
29. Echeverri M, Brookover C, Kennedy K. Nine constructs of cultural competence for curriculum development. *Am J Pharm Educ.* 2010;74(10):Article 181.
30. Echeverri M, Brookover C, Kennedy K. Factor analysis of a modified version of the California Brief Multicultural Competence Scale with minority pharmacy students. *Adv Health Sci Educ Theory Pract.* 2011;16(5):609-626.
31. Evans E. An elective course in cultural competence for healthcare professionals. *Am J Pharm Educ.* 2006;70(3):Article 55.
32. Haack S. Engaging pharmacy students with diverse patient populations to improve cultural competence. *Am J Pharm Educ.* 2008;72(5):Article 124.
33. Shah MB, King S, Patel AS. Intercultural disposition and communication competence of future pharmacists. *Am J Pharm Educ.* 2004;68(5):Article 111.
34. Trujillo JM, Hardy Y. A nutrition journal and diabetes shopping experience to improve pharmacy students' empathy and cultural competence. *Am J Pharm Educ.* 2009;73(2):Article 37.
35. Westberg SM, Bumgardner MA, Lind PR. Enhancing cultural competency in a college of pharmacy curriculum. *Am J Pharm Educ.* 2005;69(5):Article 82.
36. Assemi M, Cullander C, Hudmon KS. Implementation and evaluation of cultural competency training for pharmacy students. *Ann Pharmacother.* 2004;38(5):781-786.
37. Sales I, Jonkman L, Connor S, Hall D. A comparison of educational interventions to enhance cultural competency in pharmacy students. *Am J Pharm Educ.* 2013;77(4):Article 76.
38. American College of Clinical Pharmacy, O'Connell MB, Jackson AN, et al. Cultural competency in health care and its implications for pharmacy Part 3B: emphasis on pharmacy education policy, procedures, and climate. *Pharmacotherapy.* 2013;33(12):e368-e381.
39. American College of Clinical Pharmacy, O'Connell MB, Rodriguez de Bittner M, et al. Cultural competency in health care and its implications for pharmacy Part 3A: emphasis on pharmacy education, curriculums, and future directions. *Pharmacotherapy.* 2013;33(12):e347-e367.
40. Shaya FT, Gbarayor CM. The case for cultural competence in health professions education. *Am J Pharm Educ.* 2006;70(6):Article 124.
41. Farivar SS, Liu H, Hays RD. Half standard deviation estimate of the minimally important difference in HRQOL scores? *Expert Rev Pharmacoecon Outcomes Res.* 2004;4(5):515-523.
42. Norman GR, Sloan JA, Wyrwich KW. Interpretation of changes in health-related quality of life: the remarkable universality of half a standard deviation. *Med Care.* 2003;41(5):582-592.
43. Sargent SE, Sedlak CA, Martsof DS. Cultural competence among nursing students and faculty. *Nurs Educ Today.* 2005;25(3):214-221.
44. Kardong-Edgren S, Cason CL, Brennan AM, et al. Cultural competency of graduating BSN nursing students. *Nurs Educ Perspect.* 2010;31(5):278-285.
45. Ladson-Billings G. But that's just good teaching! The case for culturally relevant pedagogy. *Theor Pract.* 1995;34(3):159-165.
46. Rindfleisch A, Malter AJ, Ganesan S, Moorman C. Cross-sectional versus longitudinal survey research: concepts, findings, and guidelines. *J Marketing Res.* 2008;45(3):261-279.
47. VanZant S. Assessing multicultural knowledge, attitudes, skills and comfort: medical education for a changing world, Wright State University; 2014. <http://corescholar.libraries.wright.edu/mp/124/>.
48. Balcazar FE, Suarez-Balcazar Y, Taylor-Ritzler T. Cultural competence: development of a conceptual framework. *Disabil Rehabil.* 2009;31(14):1153-1160.
49. Suarez-Balcazar Y, Rodakowski J. Becoming a culturally competent occupational therapy practitioner. *OT Practice.* 2007;12(17):14-17.
50. Lypson ML, Ross PT, Kumagai AK. Medical students' perspectives on a multicultural curriculum. *J Natl Med Assoc.* 2008;100(9):1078-1083.
51. Calvillo E, Clark L, Ballantyne JE, Pacquiao D, Purnell LD, Villarruel AM. Cultural competency in baccalaureate nursing education. *J Transcult Nurs.* 2009;20(2):137-145.
52. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory.* Englewood Cliffs, NJ: Prentice-Hall; 1986.
53. Hawala-Druy S, Hill MH. Interdisciplinary: cultural competency and culturally congruent education for millennials in health professions. *Nurs Educ Today.* 2012;32(7):772-778.
54. Suarez-Balcazar Y, Rodawoski J, Balcazar F, et al. Perceived levels of cultural competence among occupational therapists. *Am J Occup Ther.* 2009;63(4):498-505.
55. Yearwood EL, Brown DL, Karlik EC. Cultural diversity: students' perspectives. *J Transcult Nurs.* 2002;13(3):237-240.
56. Mixer SJ. Use of the culture care theory and ethnonursing method to discover how nursing faculty teach culture care. *Contemp Nurse.* 2008;28(1-2):23-36.
57. Volberding JL. Perceived cultural competence levels in undergraduate athletic training students. *Athl Train Educ J.* 2013;8(3):66-70.