RESEARCH

Racial Differences in Communication Apprehension and Interprofessional Socialization in Fourth-Year Doctor of Pharmacy Students

Joseph M. LaRochelle, PharmD,^{a,b} Aryn C. Karpinski, PhD^c

^a Xavier University of Louisiana College of Pharmacy, New Orleans, Louisiana

^b Louisiana State University Health Sciences Center, New Orleans, Louisiana

^c Kent State University College and Graduate School of Education, Health and Human Services, Kent, Ohio

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Objective. To examine racial differences in communication apprehension and interprofessional socialization in fourth-year PharmD students and to investigate the relationship between the two constructs.

Methods. Two measures with reliability and validity psychometric evidence were administered to fourth-year pharmacy students at a single historically black university with a large racial minority population. The Personal Report of Communication Apprehension (PRCA-24) measures level of fear or anxiety associated with communication. The Interprofessional Socialization and Valuing Scale (ISVS) measures beliefs, attitudes, and behaviors towards interprofessional collaborative practice.

Results. One hundred fourteen students completed the survey. This produced a 77.4% response rate and 45.6% of the participants were African American. There were significant differences between races (ie, White, African-American, and Asian) on both measures. The PCRA-24 and ISVS were significantly correlated in each racial group.

Conclusion. As pharmacy education moves to more interprofessional collaborations, the racial differences need to be considered and further explored. Pharmacy curricula can be structured to promote students' comfort when communicating interprofessionally across racial groups. Understanding of culture and early education in cultural competence may need to be emphasized to navigate racial or cultural differences.

Keywords: communication apprehension, interprofessional socialization, pharmacy students, racial differences

INTRODUCTION

Enrollment of minority students in colleges and schools of pharmacy across the United States has slowly increased over time.^{1,2} In addition, the 2016 Accreditation Council for Pharmacy Education (ACPE) Standards recognize the importance of diversity and its potential to influence teaching, learning, and structure of curricula.³ Despite the more diverse enrollment and emphasis on strengthening research, the pharmacy education literature is deficient in providing information on minority students, aside from including race in the sample description.⁴

In the American Association of Colleges of Pharmacy's (AACP) 2013 Annual Profile of Pharmacy Students, underrepresented minorities (eg, Black, Hispanic, Native Hawaiian/Pacific Islander) accounted for 11.9% of PharmD students enrolled in fall 2013,¹ which was slightly lower than the previous academic year.² Asians,

who are not considered a minority by AACP, accounted for 24.6% in 2013, which slightly increased from the previous year.^{1,2} The overwhelming majority of the remaining portion were White, which has been consistent since the inception of pharmacy education. Therefore, it is not surprising that research in pharmacy education has a limited amount of studies with sizable minority samples, as is the case with medical education literature.⁵

Effective communication by pharmacists is essential in that their positions have become increasingly social and collaborative in recent years.^{6,7} Communication skills are crucial for a successful pharmacy career as a result of expanding interaction with patients and with colleagues in other health care professions. Effective communication can increase patient-pharmacist trust and compliance and ensure that cross-profession communication does not result in a mistake that could negatively impact patient care.⁸ Appendix B of the ACPE Standards emphasizes professional communication with a diverse group of individuals including patients and members of the health care team.³ The Center for the Advancement of

Corresponding Author: Joseph M. LaRochelle, Xavier University of Louisiana College of Pharmacy, 1 Drexel Drive New Orleans, LA 70125. E-mail: jlaroche@xula.edu

Pharmacy Education (CAPE) 2013 Educational Outcomes describe the pharmacist as a communicator and stress that schools should include this in the curriculum.⁹

Communication apprehension is an “individual’s level of fear or anxiety associated with either real or anticipated communication with another person or persons.”¹⁰ Pharmacists anxious about communicating may avoid contact with patients or other health professionals, which can ultimately lead to less satisfaction and poorer health outcomes of patients.¹¹ Other factors besides communication apprehension include a basic unwillingness to communicate and shyness.¹² Research in the medical education literature shows that medical students’ communication skills and styles differ by race.^{13,14} For example, in Hauer et al’s study, medical school students (N=351) participated in a standardized patient examination to assess the relationships between students’ demographic backgrounds and attitudes as they relate to communication with patients. The results indicated that White students scored significantly higher than Asian and Black students on an observational communication skills measure.¹³ In Lee et al’s larger survey study of medical students who completed a medical clerkship (N=2395), communication differences such as assertiveness and reticence were examined among different racial/ethnic groups. The findings showed that Black, East Asian, and Native American/Alaskan Native students reported greater reticence than White students.¹⁴ Although the above examples demonstrate how medical students’ communication differs by ethnicity/race, research has not explored demographic communication differences in pharmacy students, specifically the intersection of communication apprehension and race.

Related to communication, interprofessional collaboration and socialization is becoming more commonplace in the health care professions, which can include pharmacists as part of the team.¹⁵ The ACPE Standards stress the provision of care in collaboration with the interprofessional health care team and mandate interactions with other health care professionals in practice experiences.³ In addition, the CAPE Outcomes state that the pharmacist should actively participate in interprofessional collaboration with the health care team.⁹ Interprofessional socialization and teamwork (between physicians and nurses) can lead to better patient outcomes.¹⁶ Additionally, demographic variables including ethnicity impact interprofessional participation, decision making, trust building, and conflict management within cooperative learning groups.¹⁷ Although there are a few studies involving medical students in general, describing racial differences in pharmacy students’ communication and collaboration has not been explored.

The purpose of this study was to examine racial differences in communication apprehension and interprofessional socialization in fourth-year doctor of pharmacy (PharmD) students. We hypothesized that there would be racial differences (ie, White, Black/African-American, Asian) in communication apprehension and interprofessional socialization in the cohort. The main research questions included: (1) What are differences in communication apprehension (Personal Report of Communication Apprehension [PRCA-24])¹⁸ by race; (2) What the differences are in interprofessional socialization (Interprofessional Socialization and Valuing Scale [ISVS])¹⁵ by race; and (3) What the relationship is between the PRCA-24 and the ISVS in these subsets of students. As noted above, communication and collaboration are important to master in this profession. Results can provide useful information to guide university educators and administrators in opening a dialogue about racial differences in pharmacy student communication, in meeting the curricular needs of all students, and in considering how best to foster communication skills for future success in this increasingly social and diverse profession.

METHODS

This study was conducted in final semester fourth-year PharmD students at a historically black college/university. Institutional Review Board approval was granted, and copyright permission was obtained from the original author of the ISVS (the PRCA-24 is not copyrighted). During a single, regularly scheduled class meeting, the study was explained to the 155 enrolled students and paper survey instruments were distributed to those who wished to participate. Participation was voluntary and data were anonymous (ie, no unique identifiers). The survey consisted of three sections: demographics, PRCA-24, and ISVS. The demographic section included age, race, gender, and previous experience in a health care field prior to pharmacy school.

The PRCA-24¹⁸ contains 24 statements measuring the level of fear or anxiety associated with either real or anticipated communication across four contexts (ie, group, meeting, public speaking, and interpersonal—ie, dyadic) using a 5-point Likert scale, where 1=strongly disagree and 5=strongly agree (range=24-120). Each communication context is represented by six items (range=6-30 for all). Higher scores indicate more communication anxiety (coefficient α =0.93-0.95).¹⁹ In addition to internal consistency (ie, reliability), content, criterion, and construct validity evidence has been documented repeatedly,¹⁹ and with pharmacy student populations.^{7,20,21}

The ISVS contains 24 items measuring beliefs, attitudes, and behaviors underlying socialization towards

interprofessional collaborative practice using a 6-point Likert scale (1=not at all to 6=to a very great extent (range=24-144) with a “not applicable” option.¹⁴ There are three subscales: (1) self-perceived ability to work with others (ie, nine items; range=9-54); (2) value in working with others (ie, nine items; range=9-54); and (3) comfort in working with others (ie, six items; range=6-36). Higher scores indicate stronger expression of beliefs, attitudes, and behaviors reflecting/endorsing interprofessional socialization (Coefficient α =0.79-0.89). Reliability and validity evidence have been reported^{15,22} with other health care professions, including pharmacy.²³⁻²⁵

Quantitative data were analyzed using SPSS Statistics for Windows, v22.0 (IBM, Armonk, NY).²⁶ First, descriptive statistics and internal consistency reliability of the scores were examined. Second, two 1-factor analyses of variance (ANOVAs) were conducted to examine differences in racial groups on communication apprehension and interprofessional socialization. Finally, Pearson correlations were used to examine the relationships between communication apprehension and interprofessional socialization within each racial group. An a priori power analysis was conducted using G*Power 3 (Power=0.80, α =0.05).²⁷ For a 3-group independent variable (ie, one-way ANOVA) inputting a range of effect size (f) parameters based on the PRCA-24 and ISVS group means (ie, f =0.30-0.40), the total sample sizes were 111 to 66 to detect medium to large effects.²⁸

RESULTS

One hundred twenty out of 155 registered P4 students participated, yielding a response rate of 77.4%. Six students were removed because of incomplete data for a final analysis sample of 114. The average student age was 27.1 (SD=3.8). Two students in the analysis sample did not provide their age (N=112). There were 35 males (30.7%) and 79 females (69.3%). The percentage of women was slightly higher than the national enrollment (ie, 61.2%).¹ The largest reported race was Black/African-American (n=52; 45.6%), followed by

Asian (n=38; 33.3%) and White (n=24; 21.1%). Other races were not reported by the participants. Only 12 students had prior experience in other health professions or science fields besides pharmacy (ie, medical sales, nursing, chemistry, physical therapy, and medical assistant; Table 1).

Prior to analysis, the data were screened for outliers on the total scores and subscale scores in each group ($z > \pm 2.58$; $\alpha = 0.01$). There were no outliers, and the data were not significantly skewed and were mesokurtic. For the total PRCA-24, Asians had the highest mean (66.63 [SD=18.26]), and for the total ISVS, Whites had the highest average scores (121.33 [SD=12.36], Table 2). Coefficient α for the total scores was high (ie, PRCA-24=0.96 and ISVS=0.94) and ranged from 0.86 to 0.92 and 0.81 to 0.90 for the subscales, respectively. There were no significant differences between men and women on the PRCA-24 total and subscale scores, and age was not significantly correlated with the measure(s) either ($p > 0.05$ for all).²⁹⁻³¹ The same was found for the ISVS.^{32,33} Previous research supports the examination of the relationship between age and sex and the main constructs of interest (ie, communication apprehension and interprofessional socialization)²⁹⁻³³ to determine if these demographic variables need to be included as statistical controls in the proposed main analyses. The analyses found no relationship between any of the variables, which supports the exclusion of age and sex as covariates in the main analyses.

The first research question examined the differences between White, African-American, and Asian students on communication apprehension. Assumptions were examined and met prior to conducting the one-factor ANOVA ($p > 0.05$ for all). Additionally, ANOVA is robust to unequal sample sizes when the homogeneity of variance (HOV) assumption has been met, as in this case ($p = 0.28$).³⁴ There were significant differences between racial groups for the total PRCA-24 scores, with a large effect size ($F = 12.4$, $df = 2$, 111, $p < 0.001$; partial $\eta^2 = 0.18$) (classifications of effect size based on;

Table 1. Demographic Characteristics by Racial Group and in the Total Sample (N=114)

Variable	White (n=24)	Black/African-American (n=52)	Asian (n=38)	Total (N=114)
Sex				
Male	7 (29.2)	11 (21.2)	17 (44.7)	35 (30.7)
Female	17 (70.8)	41 (78.8)	21 (55.3)	79 (69.3)
Age	27.0 (3.7)	27.3 (3.7; n=50)	27.0 (4.1)	27.1 (3.83; n=112)
Previous Profession				
Nurse	1 (4.2)	-	-	1 (0.9)
Other	1 (4.2)	4 (7.7)	6 (15.8)	11 (9.6)

Sex and previous profession are reported as frequencies and percentages (n[%]). Age is reported as means and standard deviations (M[SD])

Table 2. Descriptive Statistics by Race and Total for the Dependent Variables

Measure	White (n=24)			Black/African-American (n=52)			Asian (n=38)			Total (N=114)		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
PRCA-24 (Total)	66.04	17.10	.96	50.92	14.89	.93	66.63	18.26	.96	59.34	18.13	.96
(1) Group	14.58	4.10	.87	11.33	3.93	.81	14.76	4.47	.89	13.16	4.45	.87
(2) Meeting	17.29	5.15	.89	12.42	4.70	.89	16.37	5.74	.93	14.76	5.56	.92
(3) Public Speak	18.88	5.16	.87	15.58	5.41	.83	20.08	5.04	.87	17.77	5.59	.86
(4) Interpersonal	15.29	4.88	.90	11.60	4.10	.82	15.42	5.38	.92	13.65	5.05	.90
ISVS (Total)	121.33	12.36	.91	120.94	16.42	.94	111.66	17.27	.95	117.93	16.44	.94
(1) Ability	48.67	4.52	.85	47.38	7.00	.89	44.24	6.45	.91	46.61	6.56	.90
(2) Value	46.83	5.99	.88	45.13	7.36	.90	43.24	7.14	.91	44.86	7.09	.90
(3) Comfort	25.83	5.24	.85	28.42	4.48	.71	24.18	5.22	.83	26.46	5.21	.81

PRCA=Personal Report of Communication Apprehension.¹⁸ ISVS=Interprofessional Socialization and Valuing Scale.¹⁵ The PRCA-24 has 24 items and four subscales – Small Group (Group), Meeting, Public Speaking (Public Speak), and Interpersonal (ie, Dyadic). Each subscale contains six items. The ISVS has 24 items and three subscales – Ability to work with others (Ability=9 items), Value in working with others (Value=9 items), and Comfort in working with others (Comfort=6 items)

0.01=small, 0.06=medium, 0.14=large).²⁸ Post hoc tests revealed that African Americans had significantly lower mean PRCA-24 scores compared to Whites ($p=0.001$; $d=0.94$) (classifications of effect size based on 0.20=small, 0.50=medium, 0.80=large),²⁸ and Asians ($p<0.001$; $d=0.94$; Table 2), both with very large effect sizes. A supplemental analysis (ie, one-factor multivariate ANOVA [MANOVA]) examining differences between the groups on the PRCA-24 subscales was conducted. The significant multivariate main effect showed differences between the groups for all the subscales with large effect sizes ($p<0.001$ for all; partial η^2 's=0.14-0.15). African-Americans had lower mean scores on all the subscales compared to Whites (d 's=0.62-0.99) and Asians (d 's=0.75-0.86; $p<0.05$ for all) with medium to large effect sizes for all.

The second research question examined the differences between races on interprofessional socialization.

Assumptions were examined and met ($p>0.05$ for all; HOV: $p=0.17$). There were significant differences between racial groups for the total ISVS scores with a medium effect size ($F=4.40$, $df=2$, 111, $p=0.014$; partial $\eta^2=0.07$). The results indicated that Asians had significantly lower scores compared to African Americans with a medium effect size ($p=0.022$; $d=0.55$). A one-factor MANOVA revealed there were significant differences between the groups for the Ability ($p=0.016$; partial $\eta^2=0.07$) and Comfort ($p<0.001$; partial $\eta^2=0.13$) subscales with medium to large effects. Asians reported lower mean scores compared to Whites for Ability ($p=0.027$; $d=0.80$) and lower mean scores compared to African-Americans for Comfort ($p<0.001$; $d=0.87$), both with large effect sizes.

The third research question examined the relationship between the PRCA-24 and the ISVS in White, African-American, and Asian students. Pearson correlations

Table 3. Correlations between the Interprofessional Socialization and Valuing Scale (ISVS) and the Personal Report of Communication Apprehension (PRCA-24) Scale in Whites (N=24)

Variable	1	2	3	4	5	6	7	8	9
1. ISVS Ability	-	0.53 ^b	0.33	0.76 ^c	-0.53 ^b	-0.43	-0.46	-0.004	-0.37
2. ISVS Value		-	0.39	0.85 ^c	-0.66 ^c	-0.39	-0.44 ^a	-0.43 ^a	-0.53 ^b
3. ISVS Comfort			-	0.74 ^c	-0.57 ^b	-0.64 ^b	-0.58 ^b	-0.54 ^b	-0.66 ^c
4. ISVS Total				-	-0.76 ^c	-0.62 ^b	-0.60 ^b	-0.44 ^a	-0.67 ^c
5. PRCA Group					-	0.76 ^c	0.82 ^c	0.62 ^b	0.89 ^c
6. PRCA Meet						-	0.81 ^c	0.69 ^c	0.92 ^c
7. PRCA Inter							-	0.60 ^b	0.91 ^c
8. PRCA Public								-	0.83 ^c
9. PRCA Total									-

^a $p<0.05$, ^b $p<0.01$, ^c $p<0.001$. PRCA=Personal Report of Communication Apprehension.¹⁸ ISVS=Interprofessional Socialization and Valuing Scale.¹⁵ The PRCA-24 has four subscales – Small Group (Group), Meeting (Meet), Public Speaking (Public), and Interpersonal (Inter). The ISVS has three subscales – Ability to work with others (Ability), Value in working with others (Value), and Comfort in working with others (Comfort)

were used to determine the strength, direction, and significance of the relationships. The relationship was significant and negative in each racial group: (1) White ($r=-0.67$, $p<0.001$; Table 3), (2) African-American ($r=-0.29$, $p<0.05$; Table 4), and (3) Asian ($r=-0.65$, $p<0.001$; Table 5). That is, for each racial group, as communication apprehension increased, interprofessional socialization decreased. The strongest correlation was in the White group, but all were medium to large effects (classifications of effect size based on; 0.10=small, 0.30=medium, 0.50=large).²⁸ The magnitude of the correlation coefficients between White and African-American and African-American and Asian were different ($p<0.05$), but there were no differences between White and Asian ($p>0.05$).

DISCUSSION

Results included: (1) African-Americans had lower CA compared to the other two groups overall and across all contexts; (2) Overall, African-Americans had higher IS compared to Asians; (3) by subscale, Asians had lower Ability and Comfort scores on average compared to Caucasians and African-Americans, respectively, and (4) as CA increased, IS decreased (and vice versa) in each racial group, and the relationship was significantly weaker in African-Americans compared to Asians and Caucasians.

African-Americans had lower communication apprehension overall and across all four contexts compared to Whites and Asians. Lower levels of communication apprehension among African-Americans may be attributed to the fact that the sample was obtained from a university with a large minority population. For African-American students, campus racial composition can positively influence socialization and other psychosocial factors.³⁵ A racially diverse campus with a larger African-American representation may create

a more comfortable atmosphere with a larger “in-group” with which to communicate and identify.³⁶ The larger in-group can foster less communication apprehension because of nurture-based causes such as positive reinforcement, modeling, and other environmental influences.^{37,38} This also applies to nonverbal communication behaviors (eg, head nods, interruptions, smiling/laughter) when communicating in same-race groups.³⁹

Similarly, African-Americans demonstrated a higher level of interprofessional socialization compared to Asians. African-Americans have more positive perceptions of interprofessional teamwork and education compared to other racial groups.⁴⁰ Since this study was conducted on a campus with a large minority population, there may be a higher sense to teamwork among the African-American students because there were more African-American students at the college. Additionally, Asian students have lower scores than American students on team cohesion scales.⁴¹ In a team task study, Asian students had less team and social cohesiveness and performance scores than the American students, where the majority of the latter (70%) were White.⁴¹ In the current study, interprofessional socialization scores were lower in Asians compared to Whites mirroring these results.

By subscale, Asians had lower Ability and Comfort scores on the ISVS compared to Whites and African-Americans, respectively. Asian cultures tend to use high-context communication, which includes communication styles less direct such as feelings, interpersonal sensitivity, and using silence.⁴² European cultures tend to use low-context communication, which includes dominant, animated, friendly, open, and attentive communication styles.⁴² Asians may feel out of place in a European-American dominated health care setting,

Table 4. Correlations between the Interprofessional Socialization and Valuing Scale (ISVS) and the Personal Report of Communication Apprehension (PRCA-24) Scale in Blacks/African Americans (N=52)

Variable	1	2	3	4	5	6	7	8	9
1. ISVS Ability	-	0.82	0.45 ^b	0.92 ^c	-0.26	-0.18	-0.18	0.04	-0.16
2. ISVS Value		-	0.52 ^c	0.94 ^c	-0.29 ^a	-0.27	-0.12	-0.07	-0.22
3. ISVS Comfort			-	0.70 ^c	-0.46 ^b	-0.45 ^b	-0.42 ^b	-0.21	-0.46 ^b
4. ISVS Total				-	-0.37 ^b	-0.32 ^a	-0.24	-0.07	-0.29 ^a
5. PRCA Group					-	0.80 ^c	0.61 ^c	0.32 ^a	0.80 ^c
6. PRCA Meet						-	0.73 ^c	0.56 ^c	0.93 ^c
7. PRCA Inter							-	0.42 ^b	0.82 ^c
8. PRCA Public								-	0.74 ^c
9. PRCA Total									-

^a $p<0.05$, ^b $p<0.01$, ^c $p<0.001$. PRCA=Personal Report of Communication Apprehension.¹⁸ ISVS=Interprofessional Socialization and Valuing Scale.¹⁵ The PRCA-24 has four subscales – Small Group (Group), Meeting (Meet), Public Speaking (Public), and Interpersonal (Inter). The ISVS has three subscales – Ability to work with others (Ability), Value in working with others (Value), and Comfort in working with others (Comfort)

Table 5. Correlations between the Interprofessional Socialization and Valuing Scale (ISVS) and the Personal Report of Communication Apprehension (PRCA-24) Scale in Asians (N=38)

Variable	1	2	3	4	5	6	7	8	9
1. ISVS Ability	-	0.8 ^c	0.77 ^c	0.92 ^c	-0.49 ^b	-0.56 ^c	-0.55 ^c	-0.26	-0.53 ^b
2. ISVS Value		-	0.75 ^c	0.93 ^c	-0.57 ^c	-0.53 ^b	-0.66 ^c	-0.43 ^b	-0.62 ^c
3. ISVS Comfort			-	0.90 ^c	-0.59 ^c	-0.68 ^c	-0.59 ^c	-0.48 ^b	-0.66 ^c
4. ISVS Total				-	-0.59 ^c	-0.63 ^c	-0.66 ^c	-0.42 ^b	-0.65 ^c
5. PRCA Group					-	0.80 ^c	0.74 ^c	0.60 ^c	0.88 ^c
6. PRCA Meet						-	0.76 ^c	0.73 ^c	0.93 ^c
7. PRCA Inter							-	0.62 ^c	0.89 ^c
8. PRCA Public								-	0.83 ^c
9. PRCA Total									-

^a $p < 0.05$, ^b $p < 0.01$, ^c $p < 0.001$. PRCA=Personal Report of Communication Apprehension.¹⁸ ISVS=Interprofessional Socialization and Valuing Scale.¹⁵ The PRCA-24 has four subscales – Small Group (Group), Meeting (Meet), Public Speaking (Public), and Interpersonal (Inter). The ISVS has three subscales – Ability to work with others (Ability), Value in working with others (Value), and Comfort in working with others (Comfort)

and thus have less comfort interacting with teams. These differences should be taken into account when designing interprofessional education such as including people from multiple cultures on a team. One way of incorporating cultural communication differences in pharmacy curricula is offering more team-based practice and exposure using standardized patients or other virtual practice environments. These structured scenarios can be used in an interprofessional and multicultural team-practice environment, which involves a low-stress, risk-free atmosphere for students to develop their communication skills and become aware of cultural diversity in interprofessional communication.^{13,43}

The current study also found that as communication apprehension increases, interprofessional socialization decreases (and vice versa) in each racial group; however, the relationship was significantly weaker in African-Americans compared to Asians and Whites. It would make sense that less apprehension in communication would lead to increased comfort and ability in interprofessional teams. There is a potential explanation for the weaker correlation that was observed in the African-American students. Since these scales were administered to the P4 class, they have experienced their advanced pharmacy practice experiences (APPE) with a White-dominant health care team. While African-American students were completing the study, they may have been drawing from their experiences on rotation and not on their group work in school with a large African-American population. This explanation is supported by race communication theory in general. According to Kochman, Black in-group communications styles, where they are characteristically at ease and comfortable without feeling self-conscious, decline in predominately White-dominated settings.⁴⁴ Additionally, Dornyei noted that ethnicity (and other demographic variables) can impact participation

and interaction when working in an interprofessional environment.¹⁷

As the demographics of the pharmacy student population change over time, implications for pharmacy education and preparing students for the profession need to be considered. Results from this study can provide useful information to guide university educators and administrators in understanding how to structure pharmacy curricula to maintain African-American students' confidence in communication skills and comfort level with interprofessional teamwork (ie, and also reduce communication apprehension in other groups). Our results also highlight the status of graduating PharmD students' communication and collaboration developmental needs. As interprofessional education is expanding across all health professions schools, racial differences should be taken into account in the development of the curriculum. For instance, if group work is assigned, groups may function differently if minority groups are included. Communication apprehension was lower in our sample likely because of the large African-American population, signifying that, if group work was assigned, there would likely be more than one African-American in each group, subsequently decreasing communication apprehension.

Our study also showed that the PCRA-24 and ISVS are valid and reliable tools among pharmacy students within various racial groups. In addition, our results are similar to older studies done 25 years ago in pharmacy students suggesting that the PCRA-24 continues to be a useful tool even after changing student demographics and culture.⁴⁵ To our knowledge, this is the second study to use the ISVS with only pharmacy students. Since there was a significant correlation between the two scales across all three groups (albeit, less so with African-Americans), targeted strategies to decrease communication apprehension might enhance students' abilities to interact on teams

or at least increase their perceived ability, value, or comfort in working with others. However, the significant relationship between the two constructs in these populations is exploratory and correlational, which only implies that as discomfort in communication increases, interprofessional socialization and valuing decreases (ie, description of an inverse relationship).

The ACPE Standards discuss culturally diverse environments and cultural competency in pharmacy education.³ Understanding one's own and others' cultures is essential to health care. Our study helps to stress the importance of including this education into pharmacy curricula. Once there is a strong background in cultural competence built into interprofessional education, perhaps these differences among groups could be better navigated. Schools should stress cultural competence early in the curricula through activities that would increase knowledge, skills, attitudes, and cultural collaboration in encounters.⁴⁶ For example, didactic class work, group-case scenarios, role playing using standardized patients, and real patients encountered during APPEs could all be included, with instructors paying special attention to ensure a racially/ethnically diverse composition of the groups involved in these activities.⁴⁷

This study is not without limitations. It was completed at a single university with a racially diverse student population. Our sample had 45.6 % minority participants. The overall percent of minority students in pharmacy education is 11.9 %.¹ Although the population at this university cannot be extrapolated to the entire US pharmacy school population, this study was deliberately designed to include a large minority population. Depending on the racial composition of the pharmacy program and the majority populations, these results may be applicable to other schools. If an in-group at a particular school is a minority population then communication within that group and to the "out-groups" could potentially produce communication pattern results similar to those found in this study. Additionally, English as a Second Language (ESL) data were not collected (but will be collected in future studies). Interactions among people from different cultures can cause anxiety, which is labeled intercultural communication apprehension.⁴⁸ In addition, students are more apprehensive about communicating in a second language (ie, English).⁴⁹ However, because of the small enrollment of international students at the university in the current study, the impact of ESL on communication apprehension and interprofessional socialization would be minimal. This is evidenced in a recent university profile for 2013-2014, which showed that in the fourth-year pharmacy class, there were only 10 out of 157 (6.4%) students classified as nonresident alien.⁵⁰ Our sample included

fourth-year students only. These students had been working together in groups for the previous four years and likely formed friendships and bonds with their classmates. Additionally, the therapeutics series taken during the second and third years are assigned groups for team-based learning. It is likely that because they experienced working with their classmates with different backgrounds in the past, their ideas of teamwork would be different. Also, these students were on their APPEs working with others in the health care field and had seen interprofessional collaboration first hand.

Although a small sample size was used, effect sizes were all in the medium to large range, which is important to note in small sample research. The combination of obtaining small p values ($p < 0.05$ and $p < 0.001$ in many instances) and large effect sizes in a small sample supports the successful detection of a meaningful effect.⁵¹ Additionally, although results from smaller sample sizes should be interpreted in an exploratory manner, statistical analyses are appropriate if the data are screened and assumptions are tested (eg, normality, independence, homogeneity of variances). Using the appropriate test of an assumption that is the most sensitive depending on the sample size can lead to accurate interpretation of the data,⁵² especially when it is supplemented by other graphical or descriptive information. Data in the current study were examined for each analysis to screen for outliers and test assumptions using multiple methods.

Future studies need to explore racial differences in pharmacy students that may have an influence on educational and professional success, such as the impact of communication and socialization of racially/ethnically diverse groups (eg, group dynamics) on academic achievement, and the intersection of communication and learning styles among racial groups. Examining racial differences in pharmacy students on more demographically typical university campuses for comparison should be considered, along with the purposeful data collection from other minority groups in pharmacy. Future research should also explore how communication apprehension and interprofessional socialization develop across a 4-year PharmD program. Finally, prospective investigations should develop larger models (eg, multiple regression, structural equation modeling) that represent the potential relationship between communication and interprofessional collaboration comparing pharmacy student racial groups.

CONCLUSION

In this study, communication apprehension and interprofessional socialization were examined in a racially diverse sample of 114 fourth-year PharmD students. For

communication apprehension, African-Americans had significantly lower scores than White and Asian students, and Asians had significantly lower scores as compared to African Americans for interprofessional socialization. A significant correlation between communication apprehension and interprofessional socialization was also demonstrated using the two scales and was strongest in Whites and Asian students. The study can provide useful information to guide university personnel in understanding how to maintain different racial groups of pharmacy students' confidence in communication skills and comfort level with interprofessional collaboration. As this study is exploratory and correlational, the full implications of these data are unknown. This study should be replicated in a larger population with a racial composition that more closely mirrors the pharmacy student population.

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