RESEARCH ARTICLES

Influences on Pharmacy Students' Decision to Pursue a Doctor of Pharmacy Degree

Douglas C. Anderson, Jr, PharmD, DPh, Melody C. Sheffield, PharmD,[a] Angela Massey Hill, PharmD,[b] and Henry H. Cobb, PhD[a]

[a]University of Georgia College of Pharmacy
[b]Florida A&M University College of Pharmacy

Submitted July 25, 2007; accepted October 20, 2007; published April 15, 2008.

Objectives. To determine what influenced pharmacy students to pursue a career in pharmacy and how those influences varied among different racial groups.
Methods. A 30-question survey instrument was developed and administered to doctor of pharmacy (PharmD) students at the University of Georgia and Florida A&M University. Data were analyzed to identify differences between students at different institutions and of different racial groups.
Results. Most students were encouraged by someone to pursue pharmacy. Students cited encouragement by family members, pharmacists, and students as important influences. Work and volunteer experiences were also important influences. Few students were influenced by ''career day'' events.
Conclusions. Influences for pursuing a degree in pharmacy were remarkably similar across student groups. Public awareness campaigns that emphasize the benefits of the profession and programs that are designed to bring students into contact with the profession may be effective recruiting methods/strategies.

Keywords: diversity, career choice, student recruitment

INTRODUCTION

The pharmacist shortage developed in the late 1990s and is not expected to abate for at least 5 to 10 years.[1] Some data even indicate that this shortage may persist through the year 2020.[2] The shortage has been attributed to expansion of the role of the pharmacist, transition to the doctor of pharmacy degree as the entry-level degree, part-time work patterns of many women pharmacists, and increased use of prescription drugs.[1,2] In 2001 retail pharmacies filled 3 billion prescriptions and the National Association of Chain Drug Stores projects that this number will increase.[3]

As a result of this serious pharmacist shortage, colleges and schools of pharmacy have a great interest in maintaining a large pool of prospective applicants, but it is not clear what causes an individual to be interested in becoming a pharmacist. There is limited information available about what influences students to pursue a career in pharmacy.[4-7]

Corresponding Author: Douglas C. Anderson, Jr., Southwest Georgia Pharmacy Program c/o Albany State University, 504 College Drive, ACAD-159, Albany, GA 31705-2796. Tel: 229-430-3215. Fax: 229-430-3223. E-mail: danderso@mail.rx.uga.edu

Recruitment and outreach mechanisms directed at college and high school students as well as middle and elementary school students have been described in the literature.[8] Collaboration of pharmacy schools with college advisors, local pharmacy associations, and community pharmacies can also increase interest in the profession of pharmacy.

A recent report from the Institute of Medicine (IOM) on the importance of racial and ethnic diversity among health professionals has made the recruitment process for pharmacy students even more challenging.[9] As society becomes more racially diverse, the profession of pharmacy must become more diverse as well. Minority health professionals are more likely to serve minority and medically underserved communities, and minority patients are more likely to select healthcare professionals of their own racial or ethnic background. Additionally, students from diverse backgrounds who train together develop improved cultural competency. According to the IOM report, diversity in health professions is associated with improved access to care for minority patients, increased patient choice, increased patient satisfaction, improved communication between patient and provider, and better educational experiences for all students during training.[9,10]

In 1995, a survey of first-professional year pharmacy students at the University of Georgia (UGA) College of

Pharmacy indicated the importance of pharmacist role models. Students cited the influence of pharmacy practitioners as role models most often as the factor that caused them to pursue a pharmacy degree.[4] Cline et al surveyed prepharmacy students to identify differences between applicants and nonapplicants to pharmacy schools. Factors positively associated with applying to pharmacy school included demographic traits such as race; attitudinal traits such as career commitment; academic factors such as grade point average; and the point in the individual's educational career at which the decision to pursue a career in pharmacy was made.[5] Another study indicated that students in the United Kingdom were motivated to study pharmacy because it was a science-based field. Other motivators included the reputation of the profession and financial reward, as well as personal qualities, experiences, intentions, and values.[6] A second study from the UK identified employment opportunities as the most important extrinsic influencer. Intrinsic influences included like of and aptitude for science and personal aspirations for a good career.[7] Students in Australia entered pharmacy due to good employment prospects and the desire to provide healthcare.[11]

Although these findings are beneficial, the picture of what influences students to pursue a career in pharmacy is far from complete because they do not account for regional or racial differences that may exist. The primary goal of this project was to generate data that may be used to guide colleges of pharmacy in their recruiting efforts and thus help colleges of pharmacy to be proactive in recruiting students who can best meet and serve the broad needs of our increasingly diverse patient population. A secondary goal of this study was to determine whether different factors influence students of different races to pursue pharmacy. The specific objectives of this project are to test the following hypotheses: (1) the absence of positive role models for the profession of pharmacy within their community influences minority students' decisions about selecting pharmacy as a major, and (2) negative counseling towards pharmacy as a choice of major influences minority students' decisions about selecting pharmacy as a major. For the purpose of this work, a positive role model for the profession was considered to be a pharmacist who presented the profession favorably and influenced students to pursue a pharmacy career.

METHODS

A survey instrument was written and developed to test the stated hypotheses and was validated by administering it to a group of 8 faculty members who provided comments on improving the instrument. The survey instrument was then administered to first-, second-, and third-professional year pharmacy students at the University of Georgia College of Pharmacy and Florida A & M University (FAMU) College of Pharmacy and Pharmaceutical Sciences. Survey instruments were consecutively numbered and no direct subject identifiers were collected as part of the survey process. The survey instrument was designed to be completed in 10 minutes or less while the students were in class. Incomplete survey instruments were not used in the final analysis. The test population was expected to yield a total sample size of approximately 600 students (100 students per class). Thus, a sample of 540 surveys was expected to be available for analysis. This sample size was deemed sufficient to allow group and subgroup analyses of the questions. However, there were no previous data upon which to base a power analysis for estimation of required sample size to test the hypotheses.

Data were grouped by college and tested for trends within and differences between groups and against the main hypotheses. Subgroup analyses were also done to detect trends within and differences between "minority" and "majority" groupings. "Minority" was defined as students who identified themselves as African American, Hispanic, Asian, Native American, or multi-racial. "Majority" was defined as white, non-Hispanic. The chi-square statistic was used to test for differences in proportionality data, Student's t test was used to test for differences in continuous variables. Results were considered statistically significant at $p \leq 0.05$.

RESULTS

Four hundred three survey instruments out of 600 contained complete and usable data. This represented a 67.2% return rate. Two hundred forty-one completed survey instruments were returned from UGA and 162 from FAMU. Most of the students at both institutions were in the 21- to 25-year-old age bracket (68.9% vs. 72.8% for UGA and FAMU, respectively). However, students at UGA were older, with 7.1% of students 31 years of age or older, compared to only 2.5% of FAMU students ($p = 0.021$). More students at UGA identified themselves as "majority" (83.0%), while more students at FAMU identified themselves as "minority" (89.5%; $p < 0.001$). Most students at each institution were female (70.4% of respondents from UGA and 77.2% of respondents from FAMU; $p = 0.167$). The majority of students at both institutions identified themselves as being from a lower-class, lower middle-class, or middle middle-class background. However, significantly fewer UGA students did so (64.7% vs. 73.5% for UGA and FAMU,

respectively; $p = 0.002$). Similarly, more UGA students identified themselves as coming from households with a total annual income of greater than $80,000 (45.2% vs. 27.8% for UGA and FAMU, respectively; $p < 0.001$). Fewer FAMU students had earned a baccalaureate degree prior to entering pharmacy school (22.4% vs. 32.8% for FAMU and UGA, respectively; $p = 0.031$).

Most students answered positively (agree or strongly agree) that they had been encouraged by someone to pursue pharmacy as a major. These results were consistent across institutional and racial groups (Table 1). Most students were encouraged by a family member, a pharmacist, or a pharmacy student, and there were no significant differences between institutions or racial groups (Table 2). Among UGA students, 74.8% identified the person who encouraged them to pursue pharmacy as being ''majority'' while 82.8% of FAMU students identified their encouragers as ''minority'' ($p < 0.001$). Results were similar when grouping students by race in that 85.9% of ''majority'' students were encouraged by a ''majority'' person and 87.6% of ''minority'' students were encouraged by a ''minority'' person ($p < 0.001$).

Few students felt that anyone had tried to discourage them from pursuing pharmacy as a career (Table 1). Most students at each institution stated that pharmacy was their first choice as a health profession (Table 3), with medicine being the next most commonly indicated first choice. However, there were significant differences, with fewer FAMU and ''minority'' students indicating pharmacy was their first choice. Likewise, significantly fewer FAMU and ''minority'' students indicated that they intended to practice pharmacy after graduation (Table 1). Attending medical school was the most commonly chosen option for those who did not intend to practice pharmacy, including 9.4% of FAMU students and 10.7% of ''minority'' students versus 3.2% of UGA students and 2.3% of ''majority'' students.

Most students indicated that they knew a pharmacist who influenced their decision to pursue pharmacy, and there were no differences across institutional or racial lines (65.3% vs. 61.8% of UGA and FAMU students, respectively; $p = 0.548$; 64.6% vs. 62.9% of ''majority'' and ''minority'' students, respectively; $p = 0.817$). Most students stated that they had work/volunteer experience in a healthcare setting prior to pharmacy school. However, significantly fewer FAMU and ''minority'' students indicated that they had prior work/volunteer experience (86.1% vs. 62.4% of UGA and FAMU students, respectively; $p < 0.001$; 84.9% vs. 67.0% of ''majority'' and ''minority'' students, respectively; $p < 0.001$). Most students felt that their work/volunteer experiences were positive, but significantly fewer FAMU and ''minority'' students felt their work/volunteer experiences were positive (Table 1).

A low percentage of students indicated that they were influenced by ''career day'' events. However, significantly more FAMU and ''minority'' students indicated that a ''Career Day'' event played a role in their choosing to pursue pharmacy (Table 1).

DISCUSSION

In the past 30 years the profession of pharmacy has been very successful at increasing the number of women within the profession. So successful, that now 64.2% of

Table 1. Pharmacy Students Responses to a Survey Intended to Identify Factors That Influenced Their Decision to Pursue a Doctor of Pharmacy Degree

Survey Category	UGA, No. (%) (n = 241)	FAMU, No. (%) (n = 162)	*P*	Majority,[a] No. (%) (n = 217)	Minority,[b] No. (%) (n = 186)	*P*
Students who felt they had been encouraged by someone to pursue pharmacy as a major	164 (68)	107 (66.9)	0.9	152 (70)	119 (64.7)	0.3
Students who felt someone had discouraged them from pursuing pharmacy as a major	50 (21)	25 (15.5)	0.213	49 (20.8)	26 (16)	0.281
Students who intend to practice pharmacy after graduating from pharmacy school	204 (91.9)	124 (78)	<0.001	204 (91.9)	124 (78)	<0.001
Students who felt their work or volunteer experience was a positive experience	173 (78.6)	90 (63.4)	0.002	159 (80.7)	104 (63)	<0.001
Students who felt that a ''Career Day'' event influenced their decision in choosing pharmacy	10 (4.1)	21 (13.1)	0.002	11 (4.6)	20 (12.3)	0.009

Abbreviations: UGA = University of Georgia; FAMU = Florida A&M University

[a]Majority: students who identified themselves as white

[b]Minority: students who identified themselves as African American, Asian American, Hispanic American, Native American, Multi-racial, or other

Table 2. Person Who Encouraged Students to Pursue Pharmacy as a Major

	UGA, No. (%) (n = 241)	FAMU, No. (%) (n = 162)	Majority,[a] No. (%) (n = 217)	Minority,[b] No. (%) (n = 186)
Family member	148 (39.3)	97 (45.5)	136 (39.5)	109 (44.3)
Pharmacist or pharmacy student	96 (25.5)	49 (23.0)	93 (27.0)	52 (21.1)
College instructor/advisor, or high school teacher/counselor	56 (14.9)	22 (10.3)	50 (14.5)	28 (11.4)
Other health care professional	29 (7.7)	15 (7.0)	25 (7.3)	19 (7.7)
No one	48 (12.7)	30 (14.1)	40 (11.6)	38 (15.4)

Abbreviations: UGA = University of Georgia; FAMU = Florida A&M University
[a]Majority: students who identified themselves as white
[b]Minority: students who identified themselves as African American, Asian American, Hispanic American, Native American, Multi-racial, or other

pharmacy students nationwide are female.[12] Pharmacy now faces the challenge of meeting the needs of an increasingly diverse population. Meeting these needs means that pharmacy schools must attract an increasingly diverse body of students. Understanding what factors influence students to choose pharmacy as a career is essential to this task. In this survey we explored several factors that we thought might be important in the decision to pursue pharmacy as a major and explored institutional and racial differences in those influences. Some of the findings, such as the differences in race between the 2 institutions were expected. Other findings were less expected.

Overall, there seemed to be a great deal of agreement between student groups on which influences played important roles in choosing pharmacy as their college major. Encouragement by family was the strongest influence on the students' choice of pharmacy for both "majority" and "minority" students. This is a very substantial point to consider as practitioners interface with our patients, especially in the community. A parent who encourages a student to pursue a pharmacy career has likely had a favorable interaction with the profession. Those encounters, however brief they may be, may result in a meaningful influence on a potential pharmacy student. Pharmacists and/or pharmacy students themselves also played a significant, albeit lesser, role in influencing potential pharmacy students. Considering the influence that community pharmacists have on the family of potential pharmacy students in addition to the influence pharmacists have on the potential pharmacy students themselves, it becomes evident that practitioner/role models are consequential.

An important finding from this survey was that students were more likely to be encouraged to study pharmacy from individuals who were similar to themselves. Students who identified themselves as being "minority" individuals were encouraged to pursue pharmacy by other "minority" individuals and students who identified themselves as being "majority" individuals were encouraged

Table 3. Pharmacy Students' First Choice for a Career in the Health Professions[a]

Health Profession	UGA, No. (%) (n = 241)	FAMU, No. (%) (n = 162)	Majority,[b] No. (%) (n = 217)	Minority,[c] No. (%) (n = 186)
Pharmacy	125 (53.2)	57 (36.5)	118 (51.1)	64 (40)
Medicine	69 (29.4)	53 (34)	61 (26.4)	61 (38.1)
Nursing	3 (1.3)	4 (2.6)	4 (1.7)	3 (1.9)
Dentistry	3 (1.3)	8 (5.1)	5 (2.2)	6 (3.8)
Veterinary medicine	17 (7.2)	5 (3.2)	18 (7.8)	4 (2.5)
Social work	0	0	0	0
Physical therapy	1 (0.4)	11 (7.1)	4 (1.7)	8 (5)
Occupational therapy	0	1 (0.6)	1 (0.4)	0
Respiratory therapy	0	1 (0.6)	1 (0.4)	0
Other	17 (7.2)	16 (10.3)	19 (8.2)	14 (8.8)

Abbreviations: UGA = University of Georgia; FAMU = Florida A&M University
[a]$p=0.002$ for UGA vs. FAMU; $p=0.036$ for majority vs. minority
[b]Majority: students who identified themselves as white
[c]Minority: students who identified themselves as African American, Asian American, Hispanic American, Native American, Multi-racial, or other

by other ''majority'' individuals. In addition, greater than 62% of both ''majority'' and ''minority'' students knew a pharmacist who influenced them to pursue pharmacy. Based on our findings, both ''majority'' and ''minority'' students were positively influenced and encouraged to pursue a pharmacy degree.

High school counselor/teachers and college instructors/advisors played a much less important role in influencing students. In fact, the research by Cline et al indicated that students who decided on a pharmacy career prior to high school were more likely to continue with these plans than students who made this decision during or after high school.[6] This lends support to our findings that high school teachers/counselors and college faculty members/advisors had a lesser influence on students' choice to pursue a career in pharmacy.

While the data did not allow for detection of how this was influenced, there were significantly more UGA and ''majority'' students who indicated that pharmacy was their first choice as a health profession and intended to practice pharmacy after graduation. On the other hand, more FAMU and ''Minority'' students indicated that pharmacy was not their first choice and that they intended to do something other than practice pharmacy after graduation. We hypothesize that this may be influenced by high school and college advisors or instructors who direct students toward the practice of medicine over other health careers. Of note, over 10% of ''minority'' students who participated in our survey planned to attend medical school instead of actually practicing pharmacy. Programs targeted at improving the overall quality of prepharmacy advising may increase the tendency of these professional educators to influence students towards careers in pharmacy. This is an area for future research.

Work/volunteer experience in a healthcare setting also appears to be an important positive factor that influences students. While this was consistent across groups, there was a tendency for FAMU and ''minority'' students to feel less positive about their experiences. It is incumbent on those of us who employ student workers or work with volunteers to do everything that we can to make sure that all of our student employees and volunteers have a positive experience. Programs that include volunteering in pharmacy settings, thus bringing potential pharmacy students into contact with practitioner role models, could be an effective recruiting method.

Finally, ''career day'' events played only a small role in influencing potential pharmacy students to choose the profession. Recruiting efforts that focus on ''career day'' events may be less effective at attracting potential pharmacy students, much less a more diverse student body. Still, we recognize that as long as there are ''career day'' events we, as a profession, must continue to participate, while increasing our recruitment efforts in other venues that may be more fruitful.

The major limitation of the current data is the sample size. We failed to reach our targeted return rate, and 403 usable survey instruments represented only 0.83% of students enrolled in pharmacy school in the United States at the time of the study. Because only a small percentage of ''minority'' students were not African-American, this survey was not powered to detect differences between various minority groups. More extensive surveys that reach a broader student population are needed in order to be able to detect differences between different racial groups.

Another limitation is that this was a survey of students already in a pharmacy program. Students enrolled in a college of pharmacy are likely to have had positive influences and encouragement toward their chosen course of study. Different findings could result from a survey of students who have yet to apply to a pharmacy program.

Finally, the survey did not include any investigation of the communities from which survey participants originated. This omission prevented considerations of the influences upon ''minority'' race students who may have lived in communities considered to be primarily ''majority'' race communities and vice versa.

CONCLUSIONS

Factors that positively influenced pharmacy students to choose pharmacy as a profession are remarkably similar across racial groups. Both ''minority'' and ''majority'' students knew a pharmacist who encouraged them to pursue pharmacy as a major and both ''minority'' and ''majority'' students were encouraged (primarily by family) to pursue pharmacy as a major.

Campaigns to increase public awareness of the benefits of being a pharmacist may have a significant influence on the potential pharmacy student and the people closest to them. Programs designed to bring potential pharmacy students in contact with the profession while ensuring a positive experience may be more valuable recruiting tools than ''career day'' events. Working with secondary schools and institutions of higher learning to improve the quality of prepharmacy advisement might also prove fruitful at recruiting an increasingly diverse pharmacy student body. Additionally, outreach and exposure of younger students (middle school and junior high) to pharmacy as a career choice would be appropriate.

REFERENCES

1. Department of Health and Human Services. The Pharmacist Workforce: A Study of the Supply and Demand for Pharmacists. Washington, DC: U.S. Government Printing Office, 2000.

2. Knapp DA. Professionally determined need for pharmacy services in 2020. *Am J Pharm Educ.* 2001;66:421-9.
3. Anonymous. Pharmacist shortage continues unabated, NACDS Reports. *Pharmacy Times*, 2003. http://www.pharmacytimes.com/issues/articles/2003-09_686.asp. Accessed June 14, 2007.
4. Chisholm MA, Pritchard L. Influence of pharmacists as role models. *Am J Health-Syst Pharm.* 1995;52:1348.
5. Cline RR, Mott DA, Schommer JC. Relationship between attitudes, demographics and application decisions among pre-pharmacy students: an exploratory investigation. *Am J Pharm Educ.* 1999;63:394-401.
6. Willis SC, Shann P, Hassell K. Who will be tomorrow's pharmacists and why did they study pharmacy? *Pharmaceut J.* 2006;277:107-8.
7. Wilson K, Jesson J, Langley C, Hatfield K, Clarke L. Pharmacy undergraduate students: career choices & expectations across a four-year degree programme. London: Royal Pharmaceutical Society of Great Britain, 2006.
8. Anonymous. Student Recruitment Workshop. Presented at AACP Interim Meeting, Washington, DC, February 19, 2001. Available at: http://www.aacp.org/site/tertiary.asp?TRACKID=7ZMPM83DBKBE5Y6YACDYSMRZ3HCUDC6X&VID=2&CID=862&DID=4056 Accessed June 14, 2007.
9. Institute of Medicine of the National Academies. In the Nation's Compelling Interest: Ensuring Diversity in the Health Care Workforce. Washington, DC: The National Academies Press, 2004.
10. Cuellar LM, Fitzsimmons DS. Raising pharmacists' cultural awareness. *Am J Health-Syst Pharm.* 2003;60:285-6.
11. Davy A, Evans AM, Stupans I. Pharmacy: Factors that influence the choice of career and study options. *Pharm Educ.* 2007;6:21-6.
12. AACP Research Institute. Profile of Pharmacy Students. Alexandria, Va: American Association of Colleges of Pharmacy; 2007. Available at: http://www.aacp.org/site/page.asp?TRACKID=&VID=1&CID=1420&DID=8230 Accessed April 1, 2007.