

RESEARCH ARTICLES

Neighborhood Geographical Factors and the Presence of Advanced Community Pharmacy Practice Sites in Greater Chicago

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Objectives. To determine the availability of experiential learning opportunities in culturally diverse areas and to identify opportunities and barriers to attract and sustain sites for the University of Illinois at Chicago College of Pharmacy.

Methods. Utilizing variables of census tract income, racial/ethnicity composition and crime index, data analyses included descriptive statistics and multivariate logistic regression. Faculty members involved in experiential education were interviewed to identify other factors influencing site placement and selection for community-based advanced pharmacy practice experiences (APPEs).

Results. Median family income and Asian population were significantly higher and black population was significantly lower in census tracts with community APPE sites than in census tracts without APPE sites ($p < 0.05$). No significant differences were found in the population variables of white and Latino populations and crime index. The Asian population variable was the only significant predictor of an APPE site ($p = 0.0148$) when controlling for other variables. Distance from the College, pharmacy staffing issues, goodwill, influence of district and corporate managers, and strategic initiatives were critical considerations in site establishment and overall sustainability.

Conclusion. Advanced community pharmacy practice sites were fairly well distributed across metropolitan Chicago, indicating that exposure to diverse populations during the advanced community practice experiences parallels with strategic College objectives of expanding and diversifying experiential sites to enhance pharmacy students' abilities to meet emerging patient care challenges and opportunities.

Keywords: experiential education, advanced pharmacy practice experiences, community pharmacy, students, cultural diversity

INTRODUCTION

Racial, ethnic, socioeconomic and other disparities in healthcare resources and diseases continue to be attributes of American society and challenges for our healthcare system.¹⁻⁵ Given the criticality of addressing health and healthcare-related issues among the underserved (eg, racial/ethnic minorities, the elderly, inner-city/rural populations, lower socioeconomic groups), it is imperative that

pharmacy curricula prepare future pharmacists to serve diverse populations.

The diverse makeup of healthcare consumers necessitates that colleges and schools of pharmacy and other health professions include topics of cultural competence in their curricula.⁶⁻⁷ In Campinha-Bacote's model of cultural competence, successful incorporation of cultural skills requires ample didactic and experiential components.⁸ The "cultural encounter" allows the student to experience a cross-cultural interaction with an individual from a culturally diverse background. Information describing the inclusion of cultural competency goals and objectives in pharmacy curricula has been limited,^{9,10} similar to coverage in other health-oriented educational disciplines such as medicine and nursing.^{11,12} Recent revisions to the accreditation standards and guidelines issued by the Accreditation Council for Pharmacy Education (ACPE) address the need for

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At the time of the study, Charisse L. Johnson was a graduate student in the University of Illinois at Chicago (UIC) Master of Science program in Pharmacy Administration and Miriam Mobley Smith was Director of Experiential Education at the UIC College of Pharmacy.

pharmacy students to achieve competence to provide care for culturally diverse populations,¹³ which is consistent with recommendations by the American Association of Colleges of Pharmacy (AACP) Ad Hoc Committee on Affirmative Action and Diversity,¹⁴ and the Pew Health Professions Commission.¹⁵

The goal of this study was to examine the geographical distribution and factors that influenced the establishment of advanced community pharmacy practice experiential sites for the study institution, located in the Chicago metropolitan area. The Chicago metropolitan area is one of the most racially and ethnically diverse cities in the United States, providing colleges of pharmacy in greater Chicago remarkable opportunities to partner with communities in an exchange that benefits both patients and students alike. However, like other US urban cities, the Chicago metropolitan area contains neighborhoods that are economically and socially disadvantaged,^{16,17} often resulting in less access to medical care and pharmacy services.^{18,19} The study objectives were to examine whether income level, racial/ethnic composition, and crime index of a geographically defined area (census tract) would predict the presence of a site, and to identify opportunities and barriers for the establishment of sites.

METHODS

A list of community APPE sites used by the University of Illinois at Chicago (UIC) College of Pharmacy in academic year 2002-2003 was obtained. The community APPE sites included traditional community pharmacies (ie, chain, independent, and other retail community pharmacy practice settings). Ninety sites were identified for the study year. Data collected for each community APPE site included the name of the pharmacy, street address, zip code, city, and state. All site information was obtained from faculty members in the academic programs unit (ie, experiential education office) of the UIC Department of Pharmacy Practice.

For this study, the Chicago metropolitan area was defined by the following counties: Cook, DuPage, Kane, Lake, and Will. These counties were chosen because all but one of the community APPE sites were located within these counties. The geographical unit of analysis was the *census tract*, defined by the US Census Bureau as a small, relatively permanent statistical subdivision of a county or statistically equivalent entity designed to be relatively homogenous with respect to population characteristics, economic status, and living conditions, and generally contains between 1,000 and 8,000 people, with an optimum size of 4,000 people.²⁰ Utilizing 2001 Illinois community pharmacy census data (purchased from the Illinois Department of Financial and Professional Regulation),

only census tracts containing at least 1 community pharmacy were included in the analysis.²¹ The value of the dependent variable of each census tract containing at least 1 community pharmacy was determined by the presence (1) or absence (0) of a community APPE site.

Each census tract was characterized by the independent variables of median family income (2000 US Census Bureau), ethnic/racial population percentage of blacks, whites, Asians, and Latinos (2000 US Census Bureau), and the "CrimeRisk" crime index (purchased from Tetrad Computer Applications Incorporated), which was a value derived from serious crimes (murder, rape, robbery, assault, burglary, and theft) reported against people and property.²² At the time of this study, the CrimeRisk index included the time series of 6 years (1990-1996 and 1999) of data. The index was adjusted for population and normalized to the national index of 100. For example, if the CrimeRisk index of a census tract was 200, then the probability of a person experiencing a crime was twice that of the national average.

Street address, zip code, and city were used to link each community APPE site to its respective census tract by using the online Federal Financial Institutions Examination Council Geocoding System.²³ Census tracts with community APPE sites were compared to those without such sites through descriptive statistical analyses and independent *t* tests. A Pearson correlation matrix was generated to determine relationships between the independent variables. Univariate logistic regression analyses were conducted to predict the presence of community APPE sites, and results were used to identify variables for inclusion in the multivariate logistic regression analysis (with forward selection). Data were analyzed using SAS (version 9.1, SAS, Cary, NC). The alpha level was set a priori at ≤ 0.05 to test for significant findings.

To help interpret the quantitative results and provide scope, 2 experiential education faculty members volunteered to be interviewed individually in a face-to-face format by the principal investigator. Their responses were analyzed descriptively. Study procedures were approved by the appropriate institutional review boards. The interview tool was created based upon literature review and discussions with current and former experiential pharmacy faculty members. Prior to use in the subjects, the questions were piloted on 2 other faculty members who also possessed considerable expertise in pharmacy experiential education. The small number of faculty participants for the interview process was utilized because only a limited number could provide such in-depth perspectives at the study institution. The interview tool consisted of 13 open-ended questions and was administered in summer 2003.

RESULTS

One community APPE site was excluded because it was located in Indiana, and 2 other community APPE sites were excluded because they were located in census tracts with missing data; thus, 87 community APPE sites were included in the analysis.

The geographic area of study included 1790 census tracts; 17 census tracts were excluded because they were missing 1 or more of the independent variable data, and an additional 1,169 census tracts were excluded because they did not contain at least 1 community pharmacy. In total, 604 census tracts were included in the analysis. Most community APPE sites were located in Cook County, IL.

Table 1 shows the summary statistics for census tracts with APPE sites compared to census tracts with no APPE sites, using independent variables of median family income, crime index, and racial/ethnic population proportions. Census tracts with APPE sites were characterized by higher median family incomes ($p = 0.039$), lower black populations ($p = 0.035$), and higher Asian populations ($p = 0.0068$).

Results from the Pearson correlation matrix showed that all variables were significantly correlated with each other, with the highest pairwise correlations found between the white population and median family income ($r = 0.731, p < 0.0001$) and between white and black populations ($r = -0.778, p < 0.0001$). Multicollinearity was examined as a potential problem in later multivariate models. Because the correlation coefficient did not exceed 0.9, based on the criterion cited by Hosmer and Lemeshow for exploratory studies, the variables were retained in the multivariate analyses.²⁴ To avoid excluding potentially significant variables in the multivariate analysis, a common technique was utilized in the multivariate logistic regression model development. Independent variables with p values <0.25 in the univariate logistic regression analysis were included for model entry and testing in the final multivariate analysis.

Forward selection procedure was used and the alpha level was set at 0.25 for entry in the multivariate logistic regression analysis. All other significance levels, includ-

ing the alpha level for determining significance of effects in the final multivariate model, remained at 0.05. The Hosmer-Lemeshow goodness-of-fit test indicated that there was not a large difference between the observed and predicted frequencies of community APPE sites among census tracts ($p = 0.24$), indicating a good calibration of the model. Results of the multivariate logistic regression model for variables entered are summarized in Table 2. In the final model, the Asian population variable was the only significant predictor of a presence of a community APPE site within a census tract.

Faculty Impressions from Interviews

Both of the experiential education faculty members who were contacted agreed to participate in the face-to-face interview. In separate meetings, they were asked to identify what factors influenced the availability of community pharmacies to serve as community APPE sites. Both independently stated that pharmacy staffing issues and the individual motivation of the pharmacists were major factors. They also agreed that increased distance from the College, especially outside of the Chicago metropolitan area, may have hindered the establishment of new sites because they posed substantial oversight and maintenance challenges. The most salient factor identified in determining which community pharmacies serve as community APPE sites was the influence of district/corporate management at pharmacy retail chains. The determination of which community pharmacies would serve as experiential sites was made within this hierarchy.

When asked about the difficulty in establishing new community APPE sites, one faculty member stated that the College was fortunate in having an abundance of sites because of the willingness of community pharmacies to host students for recruitment purposes. However, both remarked that difficulties arise when pharmacists who serve as preceptors leave the pharmacy due to promotion, shift in responsibilities or life circumstances, resulting in a void and forcing faculty members to find a replacement site for a student upon short notice.

Table 1. Comparison of Census Tracts With and Without Community-Based Pharmacy Practice Sites (N=604)

Independent Variable	Census Tracts With Site (n=82)		Census Tracts Without Site (n=522)		P
	Mean (SD)	Range	Mean (SD)	Range	
Crime index	131 (124)	4-438	151 (136)	4-807	NS
Median income, \$	68,345 (29,347)	2,499-175,888	61,345 (28, 408)	5,000-200,001	<0.05
White population, %	61.5 (28.9)	0-96.8	55.2 (34)	0-97.6	NS
Black population, %	15.4 (26.9)	0-97.8	22.5 (34.4)	0-100	<0.05
Asian population, %	7.3 (8.1)	0-46.9	4.8 (7.6)	0-84.5	<0.01
Latino population, %	13.8 (16.4)	0.7-72.3	15.72 (21.9)	0-99.4	NS

Table 2. Multiple Logistic Regression Analysis for the Likelihood of an Advanced Community Pharmacy Practice Experience Site Being Located in a Census Tract

Variable	Coefficient (B)	Standard Error	P	Odds Ratio	95% CI
Constant	-2.253	0.303	<0.001	0.022	
Income ^a	0.0077	0.0039	0.0501	1.008	1.000-1.016
Asian	0.0305	0.0125	0.0148	1.031	1.006-1.056

^aMedian family income in thousands of dollars.

In order to attract new community APPE sites, both faculty members noted that they had approached community pharmacies and pharmacists based upon the recommendations of others and/or the pharmacist's willingness to precept students. These relationships are formed in informal and formal gatherings. Each faculty member also stated that monetary incentives are not provided to pharmacies or individual pharmacists for hosting APPEs. However, the College provides preceptors with an adjunct faculty title and access to University services such as online library services.

In order to sustain community APPE sites, both stated that good communication and dialogue between the site and the College are crucial. The College sponsors annual preceptor meetings and continuing education programs (live, online and print). Informal feedback, assistance with teaching strategies, certificates of appreciation, and other expressions of thanks and encouragement are also used to maintain strong professional relationships with preceptors at the community APPE sites.

At the time of the study, the College recruited APPE practice sites for inclusion and, based on a random order selection process, students chose their locations from the list of those available sites. The faculty members were queried to list factors students valued most in choosing a community APPE site. By far, location (proximity to the student's residence) was believed to be the biggest influence of the student's selection of a site. In addition, the reputation of the pharmacy and/or pharmacist preceptor; faculty member and student peer opinions; and the scope of pharmaceutical services provided were important factors. When the subjects were prompted about a student's perception of neighborhood crime and its potential role in a student's selection of a community APPE site, both responded that perception of safety could influence a student's site selection. Both respondents also stated that students infrequently (ie, 0 to 1 student per year) request a change in site assignment due to concerns of safety because the students chose their own sites. When asked about the geographical distribution of sites in underserved areas, both acknowledged the program had not previously assessed the distribution of advanced community pharmacy practice sites in an empirical fashion. However,

one had the impression that most sites were located in locales with higher incomes and not enough were in areas considered as medically underserved.

The faculty members were also asked to list factors that may contribute to the lack of sufficient sites in underserved areas. One respondent stated if there was a lack of sites, it was probably due to a lack of pharmacies in underserved areas and limited pharmacy hours. The other respondent thought that pharmacies in underserved areas tend to be shorter staffed and had higher staff turnover. Both respondents agreed these factors may influence district management/corporate (retail pharmacy chains) selection of pharmacies in underserved areas to serve as community APPE sites.

To remedy the potential lack of community APPE sites in underserved areas, one respondent suggested that the recruitment, retention, and graduation of individuals with a sensitivity and commitment to improving the health care in underserved areas would be helpful. The criticality of establishing relationships with those pharmacists in underserved areas to create opportunities was emphasized.

DISCUSSION

To our knowledge, this is the first study to evaluate the distribution of advanced community pharmacy practice sites throughout ethnically, culturally, and/or socially diverse communities. The cooperation and support of this study by faculty members involved in experiential education represented another aspect of the College's multifaceted commitment to assess its curricular offerings. Mixed techniques (qualitative and quantitative) are helpful in conducting experiential education curricular assessment.

Although census tracts with APPE sites were characterized by higher median family incomes, smaller black populations, and larger Asian populations as evidenced by the independent groups *t* tests, the multivariate logistic regression model failed to reveal that income, crime index, or black, white, or Latino population variables were significant predictors of the presence of an APPE site. While the median family income variable approached significance ($p = 0.051$), it was interpreted as nonsignificant in

the final multivariate model. The quantitative findings seemingly are consistent with information obtained from the faculty members in that the individual motivation of the pharmacists and pharmacy staffing issues, as well as the influence of district or corporate management in pharmacy retail chains and strategic College initiatives, were major factors in predicting the presence of an APPE site as opposed to neighborhood geographical factors. Based on these results, it appears that community APPE sites were generally fairly distributed in consideration of income, racial/ethnic, and crime index population variables.

The Asian population variable was the only significant predictor of an APPE site. Asians are one of the wealthiest racial minority groups in the United States.²⁵ However, economic opportunity varies widely among Asian subgroups. In the Chicago metropolitan area, Asian subgroups that tend to be fluent in English (Filipinos, Indians) have significantly higher incomes than those subgroups that are less fluent in English (Koreans, Chinese, etc).²⁶ The economic advantage that Asians have over blacks and Latinos may help to explain the positive association for the Asian population variable in this study. The significance of the finding for the Asian population might also be the result of the group's lower proportional representation in the census tracts, which potentiates the effect size differences. Additionally, whites and Asians collectively comprise the majority of the student body at the UIC College of Pharmacy, accounting for approximately 85%-90% of the total student population.²⁷ Faculty interviewees noted the potential influence of the proximity to the student's residence on site selection. Although the authors are unable to explain the Asian population significance in its predictability of a community APPE site, it is speculated that an inadvertent shift in demand for APPE sites in geographic areas that mirror the predominant racial/ethnic College makeup may be a contributing factor and worth further exploration.

Crime index was used in the study as a measure of neighborhood safety within a census tract and the crime indices were not significantly different in census tracts with and without community APPE sites. When establishing a community pharmacy and/or experiential education site, the extent to which corporate pharmacy management considers neighborhood safety is unknown and worth further exploration. Yet the faculty members believed that students' perception of neighborhood crime potentially influenced the students' selection of a community APPE site. Although pharmacy students were not surveyed in the study, the above findings merit further inquiry and research into factors influencing student site selection.

The findings should be interpreted in consideration of study limitations. This was a cross-sectional study ana-

lyzing advanced community pharmacy practice sites from 1 academic year. The availability of sites may change yearly, increasing or decreasing in quantity and/or shifting geographically based on individual factors of the pharmacies. Only advanced community pharmacy practice sites from 1 college of pharmacy in Chicago were analyzed. Therefore, no attempt was made to generalize the findings, although other colleges may find the results useful in considering their own experiential programs. This study also did not control for additional neighborhood variables that may have indirectly or directly influenced the presence of an advanced community pharmacy practice sites. It is recommended that larger-scale surveys of students and other decision makers (eg, district/corporate management) at the community pharmacy be conducted. Additionally, response bias may have been introduced inadvertently by the researchers for one survey item about factors that may contribute to the lack of sufficient sites in underserved areas. Results of the quantitative analyses did not support the opinion. Additionally, further research evaluating the geographic distribution and availability of community pharmacies in the area of study, irrespective of the presence or absence of an experiential site, may be beneficial.

Despite the stated limitations, this study provides a template to assess the geographic distribution of advanced community pharmacy practice sites and has identified additional factors that likely affect site availability. Study results were considered, among other quality factors, in the introductory pharmacy practice experience (IPPE) and APPE planning processes at the UIC College of Pharmacy, which has expanded the scope and number of its experiential sites since this study in all areas of the state – urban, suburban, and rural– and beyond.

CONCLUSION

This study has provided a foundation in assessing the geographical distributions of advanced community pharmacy practice sites and a deeper understanding of the obstacles, opportunities, and factors that may influence community pharmacies to serve as sites. Replication of the study in similar urban metropolitan areas would be especially revealing to see if these and other variables could help to explain the presence and establishment of community APPE sites.

With the implementation of the 2007 ACPE Accreditation Standards and Guidelines requiring that students be educated to provide more culturally sensitive patient-centered care,¹³ as well as position statements supporting the need for cultural competence by the major pharmacy professional associations,^{28,29} colleges and schools of pharmacy are compelled to ensure that a diverse mixture of

practice sites are available for student education. Thus, it is important for each institution to examine the scope and breadth of its practice experience sites and develop effective strategies to meet these needs in the quest to foster cultural competence among pharmacy students and practitioners.

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