RESEARCH

Junior Pharmacy Faculty Members' Perceptions of Their Exposure to Postgraduate Training and Academic Careers During Pharmacy School

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Objective. To determine the perceptions of junior pharmacy faculty members with US doctor of pharmacy (PharmD) degrees regarding their exposure to residency, fellowship, and graduate school training options in pharmacy school. Perceptions of exposure to career options and research were also sought.

Methods. A mixed-mode survey instrument was developed and sent to assistant professors at US colleges and schools of pharmacy.

Results. Usable responses were received from 735 pharmacy faculty members. Faculty members perceived decreased exposure to and awareness of fellowship and graduate education training as compared to residency training. Awareness of and exposure to academic careers and research-related fields was low from a faculty recruitment perspective.

Conclusions. Ensuring adequate exposure of pharmacy students to career paths and postgraduate training opportunities could increase the number of PharmD graduates who choose academic careers or other pharmacy careers resulting from postgraduate training.

Keywords: pharmacy faculty members, residency programs, fellowships, graduate education, careers

INTRODUCTION

A unique characteristic of professional degree programs, such as the doctor of pharmacy, is the variety of postgraduate paths that can lead to academic appointments. The Accreditation Council for Pharmacy Education (ACPE) Guideline 24.1 states that "within the members of the full-time faculty, there should be an appropriate mix and balance of academic titles and experience within each discipline."[1] Whereas residency training is the most common postgraduate training path pursued by PharmD graduates, and the most commonly pursued path by pharmacy faculty members,[2] additional paths, such as fellowship training, and graduate education at the master's and doctoral levels are also pursued. In congruence with the need in pharmacy education for faculty members with a variety of training paths, each postgraduate path is distinct in terms of its training objectives and skills learned.

A reoccurring theme in the pharmacy literature is the recruitment and retention of quality pharmacy faculty members. Specifically, educators have raised concerns regarding the decreasing number of faculty members in colleges and schools of pharmacy with pharmacy training.[3-8] An American Association of Colleges of Pharmacy (AACP) Institutional Research Brief indicated 353 vacant faculty positions in US colleges and schools of pharmacy.[9] Although the relationship between recruitment/retention and faculty vacancies is arguably complex, vacancies, whatever their cause, exist because of a shortage of qualified individuals willing to fill them.

The primary objective of pharmacy postgraduate training paths is not specifically to develop academicians; however, given ACPE's recommended minimum qualifications for pharmacy faculty members, potential faculty members are most commonly those individuals who have pursued postgraduate training.[1] Previous recruitment and retention research has focused on interventions that stress scientific inquiry (to pharmacy students), use marketing models to promote academic careers, promote mentor/mentee faculty/student relationships, align individual and institution value systems, promote flexibility within pharmacy school curricula, and provide competitive stipends to individuals who pursue postgraduate training.[4,10-17]

Despite faculty recruitment and retention being labeled as a "top issue and challenge" by AACP,[9] a shortage of pharmacy faculty members still exists. Arguably,

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an understanding of US pharmacy degree earners' perceptions of commonly pursued postgraduate training paths (residencies, fellowships, and graduate school) is crucial to addressing the faculty shortage given that postgraduate training is a prerequisite for faculty appointment. Research has been conducted that has examined perceived barriers to pursuance of postgraduate training and academic careers.[18-24] However, an inherent assumption in each of these studies was that respondents had sufficient exposure to postgraduate training/academia to accurately indicate and/or rate barriers to pursuance.

Ideally, pharmacy graduates should have adequate information regarding and exposure to numerous career paths to enable informed decision making about employment and postgraduate training paths. The extent to which adequate career exploration is occurring in pharmacy colleges and schools is unknown. Hagemeier and Newton[13] conducted a study of student perceptions of exposure to graduate school and research and found that increased exposure to graduate school, research-related fields, and pharmacy faculty careers was warranted. However, the students were enrolled in the second or third year of pharmacy school at the time and may have been exposed to postgraduate training at some point after completion of the study.

The purpose of the current study was to determine the perceptions of junior pharmacy faculty members with US pharmacy degrees regarding their exposure to residency, fellowship, and graduate school training while they were completing pharmacy school. Perceptions of career exposure and exposure to research were also sought. Specifically, perceptions of academicians who had completed pharmacy school in the recent past (as defined by assistant professor status) were sought in an effort to inform career exploration and postgraduate training recruitment efforts in colleges and schools of pharmacy.

METHODS

Nineteen survey items were constructed by the authors based on previous research and included as a section of a larger survey instrument administered in spring 2011.[13] Item responses used a 5-point Likert-type scale ranging from strongly disagree to strongly agree. A response of "not applicable" was also included to capture instances in which faculty members had no experience with the item topic. Items were developed to assess faculty members' perceptions while they were completing their pharmacy degree regarding 5 primary areas: (1) the interest displayed by faculty members in various postgraduate training paths, (2) the extent to which professors displayed interest in research, (3) perceived exposure to pharmacy faculty careers and research-related fields, (4) awareness of postgraduate training-specific careers, and (5) perceptions regarding the extent to which faculty members perceived themselves to possess the skills necessary to complete postgraduate training paths at the conclusion of pharmacy school. Demographic items were also included in the survey instrument.

Prior to conducting the national study, an expert panel review and pilot study were conducted at Purdue University. Significant changes were not made to the survey items included in this analysis other than the addition of a "not applicable" response. The sampling frame for the national study was a database obtained from the AACP of 2,700 assistant professors at colleges and schools of pharmacy. Assistant professors were targeted to gather perceptions of individuals who had pursued postgraduate training in the relatively recent past as compared to associate or full professors. The sample consisted of the sampling frame minus faculty members at institutions outside the United States included in the AACP database, and minus individuals who did not have e-mail addresses included in the AACP database and for whom e-mail addresses could not be located. Therefore, the sample to which an initial contact e-mail was sent consisted of 2,634 assistant professors.

Prior to instrument administration, institutional review board approval was granted by Purdue University. A mixed-mode Tailored Design Method involving 3 contacts was used to recruit pharmacy faculty members to participate in the study.[25] After sending a pre-notification e-mail, faculty members were recruited via 2 personalized e-mails with links to the online survey instrument and a final paper-based mailing that included a cover letter, the survey instrument, and a stamped, self-addressed return envelope. Identification numbers were assigned to faculty members and used strictly to remove individuals who had returned survey instruments after previous mailings. Qualtrics survey software (Qualtrics, Inc., Provo, UT) was used to construct the survey instrument and to collect online survey responses.

Data were analyzed using PASW/SPSS version 18.0 (IBM Corp; Armonk, NY). Descriptive statistics were calculated for all items. An a priori significance level of $\alpha = 0.05$ used. In addition to individual item analysis across professor demographic characteristics, exploratory factor analysis was conducted on the items. Prior to performing exploratory factor analysis, factorability of the items was examined and items were recoded to omit "not applicable" responses. The correlation matrices were examined, and the Kaiser-Meyer-Olkin measure of sampling adequacy was determined for each item and for the instrument as a whole. The squared multiple correlations

were used as estimates of the communality of the items (ie, the diagonals of the correlation matrix). A factor loading cutoff of 0.4 was implemented. Furthermore, a minimum factor loading difference of 0.2 on other factors was also necessary to allow inclusion of a variable as a representative item for a factor on which it loaded.[26] The Kaiser criterion, Catell's scree test, and interpretability of the data were used to evaluate the number of factors to retain from the exploratory factor analysis.[27,28]

Cronbach alphas of greater than or equal to 0.7 were desired in the study.[28] Item-subscale correlations were calculated to examine the correlation of each item with the rest of the items included in the subscale. Data were considered approximately interval. Normality and homogeneity of variance were assessed by examination of item histograms, item variances, and the Shapiro-Wilk test of significance. The type of rotation used in the exploratory factor analysis was chosen to reflect the extent to which the data were normally distributed. Item responses were summed and divided by the total number of items representing each factor to produce a factor score. The factor scores were then compared across demographic variables using Pearson correlations and one-way analysis of variance (ANOVA) techniques with post-hoc Tukey tests.

RESULTS

There were 1,148 usable responses (response rate of 48.1%). Taking into consideration undeliverable e-mails and paper-based survey instruments, and return e-mails indicating individuals should be excluded from the study (absence of postgraduate training), the adjusted response rate for the study was 50.3%. Whereas only individuals who had earned a US pharmacy degree were asked to respond to the 19 items presented in this manuscript, the number of usable responses for purposes of this manuscript ranged from 723 to 735 per item. Demographic characteristics of faculty member respondents are presented in Table 1. A majority (65.4%) of respondents were female, Caucasian (79.0%), residency trained (63.7%), and members of pharmacy practice departments (89.6%). The mean age of study respondents was 35.7 years.

Response frequencies for the 19 survey items are presented in Table 2. The extent to which "not applicable" was indicated for the items ranged from 0 to 26.8%. Three items asked respondents to indicate the extent to which they agreed/disagreed with statements regarding the interest in postgraduate training paths displayed by professors. Eighty-seven percent of respondents agreed/strongly agreed that professors made residencies sound interesting, whereas 43% indicated the same was true for fellowship training and graduate school training.

Table 1. Faculty Member Demographic Characteristics (n = 726)

Variable	No. (%)
Gender	
Female	475 (65.4)
Male	251 (34.6)
Ethnicity	
African American	31 (4.3)
American Indian	3 (0.4)
Asian	67 (9.2)
Caucasian	573 (79.0)
Hispanic	27 (3.7)
Pacific Islander	9 (1.2)
Other	15 (2.1)
Institution type	
Private	310 (42.7)
Public	416 (57.3)
Department	
Medicinal chemistry	6 (0.8)
Pharmaceutics	8 (1.1)
Pharmacology	11 (1.5)
Pharmacy practice	657 (89.6)
Social/behavioral	29 (4.0)
Other	22 (3.0)
Professorial rank	
Assistant	672 (92.4)
Associate	31 (4.3)
Full	3 (0.4)
Other	21 (2.9)
Level of postgraduate training	
Post-BS PharmD	61 (8.3)
Residency	466 (63.7)
Fellowship	54 (7.4)
Master's degree	86 (11.8)
Doctoral degree	64 (8.8)
Age in years, Mean (SD)	35.7 (8.8)
Years at current rank, Mean (SD)	4.1 (3.5)

Approximately the same percentage (44%) of respondents indicated professors in the pharmacy curriculum made research sound interesting.

Approximately 57% of respondents agreed/strongly agreed that the pharmacy curriculum provided sufficient exposure to pharmacy faculty careers at their institutions of study. The extent to which respondents agreed with a similar statement specific to faculty careers outside of their institution was 36%. Similarly, 32% of respondents agreed/strongly agreed that the pharmacy curriculum provided sufficient exposure to research-related fields. Approximately 58% of respondents agreed/strongly agreed that they were aware of postgraduate opportunities offered at institutions other than the institution from which they graduated.

Table 2. Pharmacy Faculty Members' Exposure to Postgraduate Training and Academic Career Opportunities During Pharmacy School, N = 735[a]

Item	No. (%)					
	Not Applicable	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Professors with graduate degrees in the professional curriculum made graduate school sound interesting	109 (14.9)	43 (5.9)	125 (17.1)	186 (25.4)	192 (26.3)	76 (10.4)
Professors with fellowship training in the professional curriculum made fellowship training sound interesting	196 (26.8)	41 (5.6)	82 (11.2)	182 (24.9)	169 (23.2)	60 (8.2)
Professors with residency training in the professional curriculum made residency training sound interesting	49 (6.7)	11 (1.5)	19 (2.6)	62 (8.5)	246 (33.7)	343 (47.0)
Professors in my pharmacy school courses made research sound interesting	40 (5.5)	40 (5.5)	153 (20.9)	196 (26.8)	213 (29.1)	89 (12.2)
My pharmacy school professors expressed interest in students pursuing postgraduate education and skilldevelopment	21 (2.9)	16 (2.2)	40 (5.5)	98 (13.4)	298 (40.8)	258 (35.3)
The pharmacy curriculum provided me sufficient exposure to pharmacy faculty careers at my institution	19 (2.6)	39 (5.3)	146 (20.0)	123 (16.8)	251 (16.8)	153 (20.9)
The pharmacy curriculum provided me sufficient exposure to pharmacy faculty careers outside my institution	27 (3.8)	77 (10.7)	203 (28.2)	160 (22.3)	162 (22.5)	90 (12.5)
The pharmacy curriculum provided me sufficient exposure to research-related fields	20 (2.8)	76 (10.5)	230 (31.7)	172 (23.7)	167 (23.0)	61 (8.4)
At the conclusion of pharmacy school...						
I was aware of career opportunities residency training would provide	1 (0.1)	17 (2.3)	41 (5.6)	51 (6.9)	350 (47.5)	277 (37.6)
I was aware of career opportunities fellowship training would provide	4 (0.5)	53 (7.2)	193 (26.2)	183 (24.8)	231 (31.3)	73 (9.9)
I was aware of career opportunities graduate school would provide	4 (0.5)	51 (6.9)	204 (27.7)	158 (21.4)	241 (32.7)	79 (10.7)
I had the knowledge necessary to make an informed decision whether or not to consider residency training as a career option	0	20 (2.7)	40 (5.4)	58 (7.9)	327 (44.5)	290 (39.5)
I had the knowledge necessary to make an informed decision whether or not to consider fellowship training as a career option	3 (0.3)	62 (8.4)	201 (27.3)	171 (23.2)	212 (28.6)	88 (11.9)
I had the knowledge necessary to make an informed decision whether or not to consider graduate school as a career option	4 (0.5)	58 (7.9)	189 (25.6)	171 (23.2)	230 (31.2)	85 (11.5)
I had the knowledge necessary to make an informed decision whether or not to consider pharmacy academia as a career option	1 (0.1)	40 (5.4)	154 (21.0)	160 (21.8)	266 (36.2)	114 (15.5)
I had the skills necessary to successfully complete residency training	0	5 (0.7)	14 (1.9)	36 (4.9)	301 (41.0)	379 (51.6)
I had the skills necessary to successfully complete fellowship training	16 (2.2)	12 (1.7)	71 (9.8)	238 (32.8)	240 (33.1)	148 (20.4)
I had the skills necessary to successfully complete graduate school	14 (1.9)	6 (0.8)	42 (5.8)	222 (30.6)	271 (37.3)	171 (23.6)
I was aware of postgraduate opportunities offered at institutions other than the institution from which I graduated	1 (0.1)	67 (9.3)	123 (17.0)	112 (15.5)	258 (35.7)	162 (22.4)

[a] The number of respondents per item varies (N < 735) with the number of respondents who provided a response.

Over 85% of respondents indicated they agreed that, at the conclusion of pharmacy school, they were aware of the career opportunities that residency training would provide, whereas only 42% and 44% of respondents indicated the same for fellowship training and graduate school, respectively. Likewise, 84% of respondents indicated that at the conclusion of pharmacy school, they had the knowledge necessary to make an informed decision regarding whether to consider residency training as a career option. The percentage of respondents who indicated they had the knowledge necessary to make an informed decision whether to consider fellowship training and graduate education as career options was 41% and 43%, respectively. Fifty-two percent of respondents indicated that they had the knowledge necessary to determine whether pharmacy academia was an appropriate career option for them.

Regarding perceptions of the skills necessary to complete residency, fellowship, and graduate school training at the conclusion of pharmacy school, 93% of respondents agreed/strongly agreed that they had the skills necessary to successfully complete residency training, while 55% of respondents indicated the same for fellowship training and 62% for graduate school training.

All 19 items were retained for exploratory factor analysis based on factorability analyses. No items were removed from the instrument based on examination of item correlations and Kaiser-Meyer-Olkin values. The collective Kaiser-Meyer-Olkin measure for the 19 items was 0.834. The Bartlett's test was significant ($p < 0.001$), indicating absence of an identity matrix. Correlation matrices indicated no issues related to multicollinearity or singularity.

Using a principal axis factoring extraction method and a promax rotation, 5 factors were extracted that had Eigenvalues greater than 1.[29] Overall, 16 items subjected to exploratory factor analysis loaded distinctly on 1 of 5 factors. The percent of variance explained by the 5-factor model was 69.2%. The 5 items loading on the first factor represented research-focused career opportunities. Factor 2 was comprised of items representing residency interest and awareness. The 3 items that loaded on the third factor represented curricular career exposure. The fourth factor included 3 items that represented interest displayed by others in research and research-related training. The fifth factor was comprised of 2 items that could be considered specific to research-related skill competence. One item was removed from the instrument based on reliability analysis.[28] The coefficient alphas and descriptive statistics for individual constructs are presented in Table 3.

Table 3. Interest and Exposure Constructs Resulting From Exploratory Factor Analysis

Factor	Mean (SD)	Cronbach α
Research-focused career opportunities	3.1 (1.0)	0.87
Residency interest and awareness	4.2 (0.8)	0.81
Curricular career exposure	3.1 (1.0)	0.76
External interest in research and research-related training	3.6 (0.8)	0.70
Research-related skill competence	3.7 (0.9)	0.77

ANOVA output and mean scores across highest postgraduate training are presented in Table 4. Each of the constructs significantly differed across highest postgraduate training completed by faculty members. Faculty members who completed fellowship training or a doctoral degree indicated higher knowledge and awareness of research-focused careers as compared to those who had completed a post-baccalaureate (post-BS) PharmD and those who had completed a residency program. Post-BS PharmD graduates and doctoral degree earners indicated significantly lower residency interest and awareness scores compared to respondents who completed residencies, fellowships, or master's degrees ($p < 0.016$ for each item).

Regarding curricular career exposure, fellowship completers had significantly higher scores as compared to PharmD earners and master's degree earners. Those who had completed a fellowship also rated interest displayed by others regarding research and research-related training higher than their colleagues who earned a post-BS PharmD degree. Regarding research-related skill competence at the conclusion of pharmacy school, doctoral degree earners agreed to a greater extent than all other postgraduate training paths ($p < 0.04$ for each item).

Interest and exposure beliefs of study respondents were examined across gender and significant differences were found only for the items that focused on residency interest and awareness. Female faculty members indicated greater knowledge and awareness of residency training than did male respondents ($p < 0.001$).

Pearson correlation analyses revealed significant relationships between 2 postgraduate training interest-exposure constructs and respondent age. Specifically, residency interest and awareness perceptions had a significant negative relationship with age ($r = -0.286$, $p < 0.001$). Therefore, younger faculty members indicated an increased interest in and awareness of residency training. Likewise, year of employment at current rank was negatively correlated with residency interest and awareness ($r = -0.108$, $p = 0.005$). Research-related skill competency perceptions were significantly positively correlated with age ($r = 0.101$, $p = 0.008$). No other differences

Table 4. Mean Factor Scores and Significance Levels Across Level of Postgraduate Training Completed

Construct	Level of Postgraduate Training					*P*
	PharmD	Residency	Fellowship	Master's	Doctorate	
Research career opportunities	3.0[a]	3.0[a]	3.4[b]	3.3[a,b]	3.5[b]	<0.001
Residency interest and awareness	3.4[a]	4.4[c]	4.2[c]	4.1[b,c]	3.8[b]	<0.001
Curricular career exposure	3.0[a]	3.1[a,b]	3.5[b]	3.0[a]	3.3[a,b]	0.02
External interest in research and research-related training	3.3[a]	3.5[a,b]	3.9[b]	3.7[a,b]	3.6[a,b]	< 0.01
Research-related skill competence	3.7[a]	3.6[a]	3.8[a]	3.9[a]	4.3[b]	<0.001

[a,b,c] $p < 0.05$. Different superscript letters indicate Tukey post hoc significant differences across levels of training (ie, superscript 'a' factor scores are significantly different from superscript 'b' factor scores).

in responses across demographic characteristics were noted.

DISCUSSION

The authors conducted this survey to better understand the perceptions of faculty members with US pharmacy degrees regarding the extent of their exposure in pharmacy school to postgraduate training paths and the interest displayed by their professors regarding postgraduate training paths, research, and academic careers. Based on pilot study feedback, respondents were given the option of selecting "not applicable" for any of the items that they felt did not pertain to them. The large percentage of "not applicable" responses for some of the items is concerning given that most of the items were arguably applicable to all study respondents. For example, none of the faculty members responded "not applicable" to an item asking whether they had the skills to successfully complete residency training, while 16 responded "not applicable" to an almost identical item asking whether they had the skills to successfully complete fellowship training. Perhaps some individuals indicated "not applicable" when in fact they should have selected "neutral" or another response. Regardless, the responses indicate that the faculty members did not feel as comfortable answering fellowship and graduate education-specific questions.

Overall, respondents tended to respond more favorably to items that assessed perceptions of residency training. Logically, this finding might be expected given the relative prevalence of residency training and the perceived continuity of clinical training received while earning the PharmD degree. However, awareness of, exposure to, and knowledge of career opportunities and postgraduate training opportunities should be sufficient across potential education and career paths, allowing students to make more informed decisions. In this study, we would have liked to see similarly high exposure ratings and informed decision making ratings across each of the postgraduate paths assessed; however, this was not the case.

The faculty member responses reported here are merely perceptions and may not reflect reality. It is impossible to determine the extent to which the respondents' personal biases impacted their perceptions of their professors regarding fellowship training and/or graduate degrees. Possibly, no matter what faculty members presenting information on these postgraduate paths might have said or what examples they might have portrayed, these former students would not have found it of interest. The finding that twice as many respondents felt that faculty interest in residency training was displayed as compared to faculty interest in fellowship and graduate training is concerning given that interest displayed by others is one aspect of achievement motivation that has the potential to communicate task value to pharmacy students.[30]

Eccles' expectancy-value model indicates that the aforementioned factors influence achievement motivation by being integrated into cognitive processes that form motivational beliefs.[30] Motivational beliefs are perceptions. Expectancy-value theory indicates that these perceptions inform task choice decision making. For US pharmacists in particular, given the lack of awareness of and knowledge of fellowship training, graduate education, research, and academic careers, motivational beliefs are potentially being formed around insufficient information. Whether additional postgraduate training and career information provided to pharmacy students would change postgraduate training or career paths is unknown. However, lack of information regarding choices will likely influence motivational beliefs surrounding those options. Succinctly, task-specific value beliefs can and will be formed whether or not adequate information is used in decision-making processes.

Examination of responses was somewhat discouraging from the standpoint of adequacy of career exploration in pharmacy curricula. Of interest is how the respondents' perceptions of fellowship training, graduate education, research, and academic careers differ from pharmacy graduates who chose not to pursue postgraduate training of

any sort. Of concern is the sense of ignorance about education and career options reflected in the responses of the relatively more educated cohort of pharmacists who participated in this study. Future research could examine pharmacists' perceptions regarding postgraduate training paths across practice settings to see if different perceptions are noted as compared to those of academicians.

Results of exploratory factor analysis indicated that a 5-factor solution was the most appropriate solution. Mean scores for the 5 constructs ranged from 3.1 (curricular career exposure) to 4.2 (residency interest and awareness). Curricular career exposure focused on perceptions of exposure to faculty careers and research-related fields. The research-related career opportunities construct focused specifically on careers resulting from fellowship training and graduate education (mean = 3.1). Scores around the midpoint of the response scale support the need for increased career exploration in colleges and schools of pharmacy for both academic careers and research-related careers. Compared to the residency interest and awareness construct, these scores were markedly lower.

Across level of postgraduate training for US-educated pharmacists, significant differences in construct scores served to validate the constructs. For example, those who had completed a fellowship and those who had earned a graduate degree indicated higher knowledge and awareness of research-related careers than those who had completed a post-BS PharmD and those who had completed a residency. Likewise, those who had completed a residency or fellowship and those who earned a master's degree indicated significantly higher residency interest and awareness scores than did those who had earned only a post-BS PharmD and those who had earned a doctoral degree. This finding is perhaps a function of those who had completed a fellowship having previously completed residency training and of master's degrees being offered in conjunction with residency training.

Those who completed a fellowship and those who had earned a doctoral degree indicated significantly higher knowledge and awareness of research-related career exposure than those who completed a residency. However, those who earned a doctoral degree had significantly higher scores related to research-related skill competence than did those who completed a fellowship. This could be a limitation of the construct being comprised of only 2 items, or perhaps skills necessary to complete graduate education were more apparent to respondents than skills necessary to complete fellowship training. Fellowships are much less prevalent than graduate programs.[31] A concern regarding fellowship programs has been the lack of consistency across programs in the outcomes achieved and criteria for completion.[32] Therefore, decreased perceptions of skill competence could be related to misunderstandings regarding the skills necessary to succeed in fellowship training as compared to graduate training.

Although the constructs resulting from exploratory factor analysis are informative, more research regarding this topic is warranted. A comprehensive survey instrument could be constructed that would better capture elements of interest displayed in and exposure to postgraduate training paths, research, and academic careers than was captured in this study. Such an instrument could be used in colleges and schools of pharmacy to assess the extent to which adequate exposure to and information regarding postgraduate training and career options is being provided to students prior to successfully completing pharmacy school and prior to making postgraduate training, education, and career path decisions. It would also be of interest to see how perceptions of postgraduate training options change as pharmacy students progress through the curriculum.

Limitations of the current study pertain to instrument development and the study sample. Regarding instrument development, self-report questionnaires have the inherent limitation that validity cannot be guaranteed as respondents are responsible for ensuring the accuracy of responses. Cross-validating the responses of the faculty members by conducting interviews or think-aloud exercises could have increased the validity of the self-report questionnaire. However, these methods were not suitable for assessing perceptions on a large-scale basis. A pilot study was conducted to minimize errors and misunderstandings in the national study. Recall bias is another limitation as respondents had to reflect on their pharmacy school training, which could have occurred several years prior to the study. Limitations also associated with instrument development involved the factor analysis processes. Exploratory factor analysis indicated that a 5-factor solution was the best fit for the measurement model. However, exploratory factor analysis is not a completely objective analysis tool.

Study sample limitations were also present in the study. The response rate for the larger study was approximately 50%. It is not possible to determine precisely the response rate for US pharmacists within the sampling frame or within pharmacy academia. Based on the most recent AACP Profile of Pharmacy Faculty,[2] a response rate of 50% is estimated for US pharmacists in this study. Despite respondents' demographic characteristics resembling those presented in the AACP Profile of Pharmacy Faculty,[2] respondents' perceptions may differ from those of nonresponders. An analysis of early and late responders

to the survey instrument revealed no significant differences in responses across time. The directory of junior faculty obtained from the AACP included a small percentage of senior faculty members. These individuals were not removed from the study because no differences were seen in the results of the study regardless of inclusion or exclusion of senior faculty responses.

CONCLUSION

Junior pharmacy faculty members with US pharmacy degrees were less aware of fellowship training and graduate education opportunities as compared to residency training opportunities at the conclusion of their pharmacy education. Awareness of career opportunities associated with academia and research-related fields was also lacking. These findings provide evidence that career exploration and postgraduate training exploration in colleges and schools of pharmacy may need improvement. An instrument comprised of items such as those included in this study could be administered across pharmacy curricula to determine the extent to which colleges and schools of pharmacy, and even individual faculty members, are preparing students to make informed decisions about postgraduate and career paths. Ensuring that pharmacy students receive adequate exposure to and awareness of postgraduate training paths and academic career opportunities is one method of fostering recruitment of US pharmacy graduates into postgraduate education and academic pharmacy appointments.

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