RESEARCH ARTICLES

Perceived Barriers to Scholarship and Research Among Pharmacy Practice Faculty: Survey Report from the AACP Scholarship/Research Faculty Development Task Force

J. R. Robles, PhD,^a Sharon L. Youmans, PharmD, MPH,^b Debbie C. Byrd, PharmD,^c and Ronald E. Polk, PharmD^d

^aSchool of Pharmacy, Virginia Commonwealth University

^bUniversity of California-San Francisco School of Pharmacy

^cCollege of Pharmacy, University of Tennessee

^dSchool of Pharmacy, Virginia Commonwealth University

Submitted December 1, 2007; accepted March 17, 2008; published February 19, 2009.

Objectives. To identify problems that pharmacy practice faculty members face in pursuing scholarship and to develop and recommend solutions.

Methods. Department chairs were asked to forward a Web-based survey instrument to their faculty members. Global responses and responses stratified by demographics were summarized and analyzed.

Results. Between 312 and 340 faculty members answered questions that identified barriers to scholarship and recommended corrective strategies to these barriers. The most common barrier was insufficient time (57%), and the most common recommendation was for help to “identify a research question and how to answer it.” Sixty percent reported that scholarship was required for advancement but only 32% thought scholarship should be required. Forty-one percent reported that the importance of scholarship is overemphasized.

Conclusions. These survey results provide guidance to improve the quantity and quality of scholarship for faculty members who wish to pursue scholarship, although many of the survey respondents indicated they did not regard scholarship as a priority.

Keywords: scholarship, research, barriers, faculty, faculty development, pharmacy practice

INTRODUCTION

Academic pharmacy organizations have consistently identified scholarship as an important activity for pharmacy faculty members.¹⁻⁴ However, pharmacy practice faculty members often find it challenging to pursue scholarship. A number of surveys, review articles, and opinion pieces have identified barriers to scholarship and have suggested solutions.⁵⁻¹¹ Since publication of these reports 10 or more years ago, the demographics of practice faculty members have changed and their expectations towards scholarship may have changed as well.

In October 2006, Raylene Rospond, then chair of the American Association of Colleges of Pharmacy (AACP) Section of Teachers of Pharmacy Practice, formed the Scholarship/Research Faculty Development Task Force. The committee was charged to “assess the status of scholarship/research among clinical practice faculty and to make recommendations based on its findings to AACP

leadership.” The 4 committee charges were to (1) identify faculty development needs related to scholarship and research; (2) identify resources already available to address these development needs; (3) develop recommendations for the Section of Teachers of Pharmacy Practice and for AACP leadership about programs for development of research and scholarship; and (4) develop recommendations for colleges and schools of pharmacy on the development of research and scholarship.

The committee consisted of Ron Polk (chair), Debbie Byrd, and Sharon Youmans. This is the committee’s report based on the results of a survey addressing the committee charges.

METHODS

Construction of the Survey Instrument

The committee decided that a survey of practice faculty members would be an appropriate strategy to obtain broad input to the committee’s charges. The committee drafted a questionnaire with 3 goals: (1) obtain demographic information about the respondents; (2) ask faculty

to directly respond to the 4 committee charges listed above; and (3) obtain information on faculty attitudes towards scholarship, including the importance of scholarship to advancement at their institutions. Respondents were told that, for purposes of the survey, the committee used Boyer's definition of "scholarship/research," including "the scholarship of discovery," "the scholarship of teaching," and "the scholarship of integration."¹² Respondents were also told that the committee considered scholarship to include book chapters, review articles, and case reports. This definition is implied in all references to scholarship or research in this report.

An experienced survey researcher reviewed the first draft of the questionnaire and suggested changes which the committee incorporated into the next draft. A pilot study of the revised questionnaire was then conducted with 6 clinical practice faculty members at Virginia Commonwealth University and their suggestions were incorporated into the final questionnaire. The committee obtained investigational review board approvals from the University of California-San Francisco, Virginia Commonwealth University, and the University of Tennessee. The final survey instrument contained 30 questions, 3 of which were open-ended questions calling for free-text responses. The questionnaire is available from the corresponding author. The questionnaire was placed into Survey Monkey (www.surveymonkey.com). An e-mail with an introduction and statement of purpose along with an Web link to the survey was sent on May 15, 2007, to an AACCP list of pharmacy practice chairs who were asked to forward the e-mail to their faculty members. Faculty members were informed that responses to the questionnaire would be anonymous; there were no individual identifiers in the data. A second request identical to the first was sent to increase the sample size. The final survey results were downloaded from Survey Monkey on June 17, 2007.

Statistical Analysis

Survey Monkey provided summary statistics of the survey results as well as individual-level data. Global responses were analyzed (all evaluable responses) and individual-level responses were stratified by selected demographic variables (below).

Most of the questions required quantitative responses and were of 2 types: priority ranks and numerical answers. These responses were reported as means and standard deviations, and the differences between groups were estimated using a nonparametric test of differences between the means (Wilcoxon/Mann-Whitney test). Priority rank scores are within-respondent orders generated from the highest priority (1) to the lowest priority (5) for each

respondent. These orders require a complex multivariate analysis. However, to keep the analysis at the minimum of statistical complexity, a combination of between-group and within-subject analysis is presented.

For contingency table data, standard tests of independence were performed using the Pearson test. A multivariate analysis for binary outcomes used a logit model, and parameters were estimated using a Generalized Linear Model with binomial reference distribution and logistic link function. All statements that report or describe differences refer to statistically significant differences ($p < 0.05$).

Selected demographic variables were used to stratify the analysis of responses including gender, age (above/below the median), tenure/tenure eligibility (yes/no), clinical teaching/service load ("light"=less than 6 months/year, "heavy"= 6 months or more/year), and school type (public/private). Other possible stratification variables were not used because the distribution was skewed (eg, 94% of the respondents had a PharmD degree) or because they were redundant with respect to other variables already selected (eg, faculty rank gave almost identical stratification to age groups). The selected stratification variables were used both for the cross-tabulations and the mean difference tables.

RESULTS

Survey Sample

A total of 343 respondents completed question number one, and the number of respondents declined through the survey; 299 faculty completed the final question. We report here all responses to the questions that directly addressed the four committee charges (n=340 who responded to the question addressing charge number 1, declining to n=312 who responded to charge number 4). However, we parsed the remaining analysis by eliminating respondents with more than 50% missing answers (by filtering questionnaire completion time < 4 minutes). This reduced the analysis to 308. Furthermore, since we were most interested in assessing the perceived needs and attitudes of practice faculty, we parsed the remaining responses to focus on that group. Specifically, among the 308 respondents who responded to a question that asked for the number of months that they were "on service," 55 (18%) reported that they had no clinical service responsibilities/year. We eliminated these respondents from additional analysis and all of the results reported below—exclusive of responses to the 4 main committee charges described above—consist only of responses from the ~250 faculty who actually reported having a clinical practice (≥ 1 month/year) and who completed the questionnaire. The actual number of faculty who completed each of the questions is included in the summary tables (below).

Table 1. Global and Subgroup Demographics of Pharmacy Practice Faculty Members Responding to a Survey on Perceived Barriers to Scholarship and Research (n=255)

Global and Subgroups Mean (SD)	Number of Students Personally Precepted Each Year at Practice Site						Classroom Teaching and Scholarship			
	Salary ^a		PharmD Students		Fellow/Resident Students		Teaching, (hours/year) ^b		Scholarship, (%) ^c	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Global	92 (16)		13 (7)		2.0 (1.8)		39 (22)		19 (22)	
Female	92 (16)		13 (7)		1.9 (1.8)		38 (23)		18 (21)	
Male	91 (16)	0.76	13 (7)	0.57	2.3 (1.8)	0.10	40 (21)	0.36	21 (24)	0.21
Age <35, y	93 (15)		14 (6)		2.1 (1.7)		36 (23)		19 (24)	
Age >35, y	90 (18)	0.16	13 (8)	0.19	2.0 (1.9)	0.18	42 (22)	0.05	19 (19)	0.10
Non-Tenured	90 (18)		13 (6)		2.1 (1.8)		38 (22)		13 (12)	
Tenured	97 (8)	0.01	14 (7)	0.76	1.8 (1.7)	0.15	42 (21)	0.19	29 (31)	<0.001
Heavy Clinical Load	91 (17)		14 (7)		2.0 (1.8)		39 (22)		15 (17)	
Light Clinical Load	98 (7)	<0.001	11 (7)	0.01	2.1 (1.7)	0.45	40 (22)	0.61	35 (31)	<0.001
Private School	98 (8)		14 (7)		1.5 (1.2)		39 (22)		16 (19)	
Public School	90 (18)	<0.001	13 (7)	0.16	2.2 (2.0)	<0.001	39 (22)	0.98	20 (23)	0.33

^aSalary: Percentage of salary paid by the college/school of pharmacy

^bTeaching: Hours of lectures and/or classroom instruction in the college/school of pharmacy each year

^cScholarship: Percentage of time devoted to scholarship/research

Demographics

Demographics collected by the questionnaire included age (mean=38.0 ± 9.7 years, median=35 years), gender (65% female, 35% male), academic rank (professor = 11%, associate professor = 29%, assistant professor = 56%, instructor = 4%), type of school (69% public, 31% private) and academic degree (94% PharmD). Additional demographic variables, including salary support and

teaching responsibilities stratified as described above, are included in Table 1.

Responses to the Four Committee Charges

Charge 1: Faculty Development Needs. (Table 2)
The priority rank order for the 4 main options was, from the most important to the less important: More time to do Research > Collaborators > Funds > Didactic Courses.

Table 2. Pharmacy Practice Faculty Members Responses to the Item: "Identify faculty development needs of pharmacy practice faculty related to scholarship and research." (n=249)

Characteristic	Scholarship/Research Development Needs							
	More Time		Didactic Courses		Collaborators		Funds	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Global	1.71 (0.94)		3.11 (1.12)		2.33 (0.97)		3.00 (1.04)	
Female	1.77 (0.96)		3.01 (1.15)		2.22 (0.95)		3.12 (0.99)	
Male	1.59 (0.87)	0.150	3.30 (1.06)	0.074	2.50 (0.98)	0.035	2.81 (1.09)	0.028
Age<35	1.78 (0.95)		3.02 (1.13)		2.26 (0.94)		3.10 (1.10)	
Age>35	1.62 (0.93)	0.110	3.28 (1.13)	0.113	2.41 (0.99)	0.315	2.87 (0.96)	0.040
No PharmD	1.80 (1.01)		3.13 (1.19)		2.40 (1.12)		2.80 (1.08)	
PharmD	1.70 (0.94)	0.712	3.11 (1.12)	0.986	2.33 (0.97)	0.805	3.02 (1.04)	0.444
Non-Tenured	1.75 (0.95)		2.96 (1.12)		2.26 (0.99)		3.18 (1.00)	
Tenured	1.63 (0.92)	0.288	3.41 (1.07)	0.002	2.47 (0.93)	0.098	2.65 (1.03)	<0.001
Heavy Clinical Load	1.71 (0.92)		3.03 (1.12)		2.30 (0.99)		3.12 (1.01)	
Light Clinical Load	1.71 (1.04)	0.742	3.50 (1.04)	0.010	2.45 (0.89)	0.304	2.45 (0.99)	<0.001
Private School	1.67 (0.92)		3.23 (1.17)		2.23 (0.91)		3.00 (0.97)	
Public School	1.73 (0.95)	0.692	3.05 (1.10)	0.180	2.37 (1.00)	0.293	3.01 (1.07)	0.878

“More time to do research” was first priority (mean rank 1.71, significantly lower than the second option $p < 0.001$), and this first priority status was consistent across strata with no significant differences between groups. Stratification affected other rank scores. Female respondents considered the need for collaborators more important than did male, while male respondents assigned more priority to the need for funds than did female. Faculty members above the age of 35 assigned more priority to the need for funds than did younger faculty members. Other significant differences include the need for didactic courses, which was assigned a higher priority by non-tenured faculty members and faculty members with higher clinical service responsibilities. The need for funding was assigned higher priority by tenured/tenure-eligible faculty members and respondents with lighter clinical responsibilities.

Charge 2: Identify resources already available. (Table 3) For the global results, the three proportions of availability of resources were significantly different from each other ($p < 0.01$). Collaborators/mentors were the resource considered available by most respondents (72.3%), while the less available resource was funding (30.9% availability). Only two significant associations with stratification variables were found, one on availability of didactic courses and one on availability of funds. Respondents younger than 35 considered that didactic courses were less available than did respondents 35 years old or older ($p < 0.05$). Regarding availability of funds, 28% of faculty members with heavy clinical load considered funds to be

available compared to 45% of faculty with light clinical load ($p < 0.05$). Faculty members with less clinical teaching/service were more likely to identify funds as an available resource.

Charge 3. Recommendations for the AACP Section of Teachers of Pharmacy Practice and AACP Leadership. (Table 4) There were 3 recommendations in a virtual tie for the first priority: “Grant writing courses”, “Keys to successful funding,” and “How to identify a research question and then how to answer it” (average ranks of 2.82, 2.83 and 2.86, respectively). “Study design courses” and “Biostatistics courses” were secondary priorities, with no significant differences between them. However, the order of these priorities was affected by stratification. “Keys to successful funding” was the highest priority for male faculty members, respondents age 35 and older, and faculty members with lighter clinical service load, with significant differences across all these strata. For respondents younger than 35, the first priority was “How to identify a research question and then how to answer it.” Other significant between-group differences were found in gender, with females prioritizing “Study design courses” more than males, and tenure status, with tenured faculty members prioritizing “Grant writing courses” more than non-tenured, and assigning less priority to “Study design courses” and “Biostatistics courses” than non-tenured. Finally, faculty members with heavier clinical service/teaching loads assigned higher priority to “Biostatistics courses” than did those with lighter clinical service/teaching responsibilities.

Charge 4. Recommendations for schools of pharmacy. (Table 5) There is a virtual statistical tie for the global priority between “How to identify a research question and then how to answer it” and “Grant writing courses,” and the two options are statistically different from the rest ($p < .01$). Female respondents assigned a higher priority to “How to identify a research question and then how to answer it” than did male. Male faculty members assigned a higher priority to “Grant writing courses” than did female, and tenured/tenure eligible faculty members differed from non-tenured in the same sense.

Perceived Importance of Scholarship

The perceived importance of scholarship was assessed by questions 8 (“How important is scholarship to your advancement?”) and 9 (“How important should scholarship be to your advancement?”). (Table 6 and Figure 1) The responses to both questions are presented in Figure 1. Sixty percent of all respondents (154 of 255) indicated scholarship was required for advancement at their institution (Figure 1). In marked contrast, only 82 respondents (32%) believed scholarship should be required for advancement,

Table 3. Pharmacy Practice Faculty Members Responses to the Item: “Identify resources already available to address these development needs” (n=249)

Respondents Indicating Resources Were Available	Available Resources for Scholarship		
	Didactic Courses	Collaborators/ Mentors	Funds
Global, No.	122	180	77
Global (%)	49.00	72.29	30.92
Female (%)	49.69	72.33	32.70
Male (%)	45.35	73.26	29.07
Age<35 (%)	40.65 ^a	71.54	26.83
Age>35 (%)	56.64 ^a	75.22	34.51
Non-Tenured (%)	45.18	74.70	28.92
Tenured (%)	56.63	67.47	34.94
Heavy Clinical Load (%)	47.34	72.46	28.02 ^b
Light Clinical Load (%)	57.14	71.43	45.24 ^b
Private School (%)	43.59	66.67	30.77
Public School (%)	51.46	74.85	30.99

^aSignificant difference

^bSignificant difference

Table 4. Pharmacy Practice Faculty Members Responses to the Item: “Develop recommendations for the Section and for AACP leadership for programming related to the development of research and scholarship in pharmacy practice faculty.” (n=248)

Characteristics	Study Design Courses		Biostatistics Courses		Grant Writing Courses		Keys To Successful Funding		How to Identify a Research Question and How to Answer It	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Global	3.14 (1.33)		3.65 (1.24)		2.82 (1.23)		2.83 (1.42)		2.86 (1.69)	
Female	3.02 (1.30)		3.54 (1.26)		2.89 (1.23)		3.03 (1.48)		2.75 (1.69)	
Male	3.35 (1.38)	0.05	3.85 (1.18)	0.07	2.67 (1.22)	0.17	2.49 (1.24)	0.01	3.08 (1.67)	0.16
Age<35	3.00 (1.34)		3.51 (1.27)		2.90 (1.28)		3.28 (1.38)		2.57 (1.67)	
Age>35	3.32 (1.33)	0.07	3.81 (1.20)	0.07	2.70 (1.17)	0.24	2.37 (1.31)	<0.001	3.16 (1.64)	0.01
No PharmD	2.60 (1.45)		3.87 (1.13)		2.93 (0.80)		2.47 (1.36)		3.13 (1.88)	
PharmD	3.18 (1.32)	0.12	3.63 (1.25)	0.53	2.81 (1.25)	0.66	2.85 (1.43)	0.31	2.85 (1.68)	0.49
Non-Tenured	2.96 (1.37)		3.49 (1.25)		2.98 (1.22)		3.10 (1.47)		2.73 (1.69)	
Tenured	3.51 (1.19)	<0.001	3.96 (1.18)	<0.001	2.51 (1.19)	0.01	2.29 (1.16)	<0.001	3.12 (1.66)	0.09
Heavy Clinical Load	3.09 (1.35)		3.57 (1.26)		2.88 (1.23)		2.93 (1.44)		2.80 (1.69)	
Light Clinical Load	3.39 (1.26)	0.18	4.02 (1.11)	0.03	2.52 (1.21)	0.09	2.31 (1.20)	0.01	3.17 (1.65)	0.18
Private School	3.24 (1.43)		3.69 (1.27)		2.72 (1.25)		2.90 (1.35)		2.77 (1.66)	
Public School	3.09 (1.29)	0.39	3.62 (1.24)	0.60	2.87 (1.22)	0.36	2.79 (1.46)	0.53	2.91 (1.70)	0.57

and the most common response was that scholarship should be “somewhat important” to advancement. Faculty members with lighter teaching responsibilities (defined as <6 months/year of clinical service activity per year) and those in a tenure-eligible position were more likely to believe scholarship should be required for promotion compared to faculty members with greater clinical service responsibility and those who were not tenure-eligible. (Table 6)

To expand the analysis of this issue, a discrepancy score was computed using Q9-Q8 (the numerical difference between an individual’s response to question 9 and question 8). A positive value of this score indicates that scholarship is underemphasized (the respondent believes that scholarship should be more important than it currently is), a negative score indicates that scholarship is overemphasized (scholarship is currently more important than it should be), and a 0 score indicates there is no

Table 5. Pharmacy Practice Faculty Members Responses to the Item: “Develop recommendations for Colleges and Schools of Pharmacy on the development of research and scholarship of pharmacy practice faculty.” (n=246)

Characteristics	Study Design Courses		Biostatistics Courses		Grant Writing Courses		Keys to Successful Funding		How to Identify a Research Question and How to Answer It	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Global	3.10 (1.34)		3.67 (1.23)		2.89 (1.18)		3.01 (1.42)		2.79 (1.71)	
Female	3.01 (1.32)		3.59 (1.26)		2.99 (1.22)		3.15 (1.48)		2.61 (1.69)	
Male	3.27 (1.39)	0.16	3.81 (1.16)	0.20	2.70 (1.12)	0.05	2.78 (1.24)	0.05	3.11 (1.69)	0.03
Age<35	2.98 (1.29)		3.44 (1.23)		2.99 (1.27)		3.25 (1.38)		2.61 (1.75)	
Age>35	3.27 (1.39)	0.10	3.92 (1.19)	<0.001	2.74 (1.11)	0.16	2.77 (1.31)	0.01	2.96 (1.63)	0.06
No PharmD	2.60 (1.30)		4.07 (1.03)		2.73 (0.80)		2.60 (1.36)		3.07 (1.94)	
PharmD	3.13 (1.34)	0.15	3.64 (1.24)	0.21	2.90 (1.20)	0.53	3.04 (1.43)	0.25	2.77 (1.70)	0.55
Non-tenured	2.97 (1.33)		3.47 (1.24)		2.99 (1.20)		3.17 (1.47)		2.79 (1.75)	
Tenured	3.37 (1.34)	0.03	4.06 (1.12)	<0.001	2.67 (1.12)	0.05	2.69 (1.16)	0.01	2.78 (1.63)	0.88
Heavy clinical load	3.07 (1.34)		3.57 (1.26)		2.94 (1.19)		3.05 (1.44)		2.79 (1.74)	
Light clinical load	3.24 (1.38)	0.48	4.12 (0.99)	<0.001	2.62 (1.15)	0.10	2.81 (1.20)	0.32	2.76 (1.59)	0.94
Private School	3.18 (1.37)		3.64 (1.31)		2.96 (1.21)		2.96 (1.35)		2.68 (1.70)	
Public School	3.06 (1.34)	0.52	3.68 (1.20)	0.99	2.85 (1.17)	0.56	3.04 (1.46)	0.70	2.83 (1.72)	0.53

Table 6. Pharmacy Practice Faculty Members Responses to the Items: “How important is scholarship/should scholarship be for advancement in your current position?” (n=249)

Characteristic	Is Important		Should Be Important	
	Mean ^a	p	Mean ^a	p
Global	3.35 (0.91)		2.85 (0.93)	
Female	3.38 (0.86)		2.84 (0.91)	
Male	3.31 (0.96)	0.81	2.88 (0.96)	0.65
Age < 35 y	3.37 (0.88)		2.80 (0.92)	
Age > 35 y	3.29 (0.93)	0.63	2.88 (0.95)	0.55
Non-tenured	3.27 (0.95)		2.70 (0.90)	
Tenured	3.51 (0.80)	0.06	3.14 (0.93)	0.00
Heavy clinical load	3.28 (0.95)		2.72 (0.92)	
Light clinical load	3.69 (0.56)	0.02	3.48 (0.74)	0.00
Private school	3.33 (0.95)		2.79 (0.97)	
Public school	3.35(0.89)	1.00	2.87 (0.92)	0.62

Scoring: 1 = not important to 4 =required

discrepancy between the expectations for scholarship for advancement by the institution and the respondent. The results indicate that 51% of respondents believe that no discrepancy between institutional expectations and their own assessment of the importance of scholarship, 8% that scholarship is underemphasized, and 41% that scholarship expectations are overemphasized for career development.

To further analyze the explanatory factors of this perception of the importance of scholarship, a multivariate model was created including several factors recorded by the questionnaire. To create a model appropriate to the multivariate nature of the process but at the same time accommodate the sample size and the distribution of the scores, the importance score was recoded as a binary vari-

Figure 1. Importance of Scholarship. Global responses to the questions “How important IS scholarship for advancement in your current position” and “How important SHOULD scholarship be for advancement in your current position?” See text for responses stratified by demographic variables.

able, with the two categories of no discrepancy and underemphasis given as a group and overemphasis as a second group. This binary variable results in percentages (59%/41%) that are manageable for multivariate modeling.

The results of the logit model show that the only factor that determines the perception of scholarship as overemphasized is the perception of preparation for research. In other words, respondents who think that their training has prepared them for research moderately well or well are less likely to think that the role of scholarship is overemphasized. The other factors considered in the model are age, gender, type of school, clinical service load, number of student/residents, number of papers published in the last 5 years, and percentage of salary paid by the school. None of these additional factors has a significant effect, indicating that 41% of the respondents share the perception of scholarship as overemphasized.

Numbers of Annual Publications for Advancement

For all respondents, the modal value was one publication/year, but respondents listed 0.5 publications/year nearly as often (Figure 2). When stratified, faculty with heavy clinical teaching/service responsibilities (>6 months/year) were significantly more likely to regard fewer publications, such as 0.5 publications/year, as acceptable when compared with faculty who had lighter

Figure 2. Publications. Responses to the question “What do you consider to be a reasonable number of peer-reviewed, primary authorship publications per year for practice faculty to receive an evaluation of “acceptable” for scholarship/research.” (n = 255). Responses stratified by “heavy” (n = 212) versus “light” (n = 43) clinical service/teaching responsibilities (see text). Faculty with lighter clinical responsibilities were significantly more likely to regard a larger number of annual publications as reasonable.

clinical service responsibilities. Tenure-eligible faculty were significantly more likely to regard a larger number of publications/year as acceptable in comparison to non-tenure-eligible faculty (Table 7). Nearly 30% of respondents stated that the number of expected annual publications was not explicitly stated.

Private Versus Public Schools of Pharmacy

Respondents from both public and private schools of pharmacy indicated that scholarship was required for advancement {approximately 60% in both groups}. However, faculty employed by private schools regarded significantly fewer publications per year as acceptable compared with faculty employed by public schools of pharmacy. (Table 7)

DISCUSSION

Previous Literature

Many responses to this survey were consistent with reports published 10 or more years ago.^{1,2,8-11} Four recent reports are noteworthy and relevant to the current investigation.

Pickard conducted a Web-based survey of 82 clinical track practice faculty at the University of Illinois in November 2005 and received responses from 39 (48% response rate).⁶ A majority of respondents were “interested in being [a] co-investigator or lead investigator on a research grant proposal” and most had “interest in receiving methodological guidance and administrative support in order to pursue research interests.” Furthermore,

respondents identified issues that called for such additional resources as statistical support and grant writing advice and mentorship. Respondents cited several barriers that kept them from pursuing scholarship, including a lack of confidence in their research skills, difficulty of balancing other responsibilities, and the need for reward for their effort. The authors acknowledged that the sample size was relatively small and might lack generalizability.

A second relevant report is a 2006 white paper *The State of Science and Research in Clinical Pharmacy*, prepared by the Research Affairs Committee of the American College of Clinical Pharmacy (ACCP).² The committee conducted an e-mail survey of all 7,757 members of ACCP and received a response from 780 members (10.1% response rate). Looking at the history, current state, and trends of research training in pharmacy, the committee identified changes necessary for overcoming barriers to pharmacy research. The white paper outlines 9 recommendations to the “Profession of Pharmacy” and 7 to ACCP for realizing an advanced vision of pharmacy-directed research by 2030. The paper focused on preparing future researchers, however, rather than on current clinical scientists. Nevertheless, many of the committee’s recommendations echo concerns raised by our survey respondents, including the need for protected time, the importance of mentorship, and the requirement for formal training in research methodology.

A third report published in 2007 was a survey of literature on barriers to scholarship among practice faculty

Table 7. Pharmacy Practice Faculty Members Responses to Questions Regarding Publications^a

Characteristics	No. of Publications					
	Reasonable to Expect Per Year ^a (n=249)		Currently Required Per Year ^b (n=178)		Published Last 5 Years ^c (n=249)	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Global	0.94 (0.71)		1.27 (0.82)		1.19 (1.25)	
Female	0.83 (0.55)		1.21 (0.77)		0.99 (1.14)	
Male	1.16 (0.89)	0.02	1.40 (0.90)	0.34	1.59 (1.36)	<0.001
Age<35	0.87 (0.64)		1.17 (0.78)		1.01 (1.18)	
Age>35	1.02 (0.76)	0.10	1.39 (0.87)	0.14	1.41 (1.29)	<0.001
Non-Tenured	0.77 (0.54)		1.18 (0.79)		0.82 (0.95)	
Tenured	1.27 (0.86)	<0.001	1.45 (0.86)	0.08	1.92 (1.44)	<0.001
Heavy Clinical Load	0.83 (0.61)		1.19 (0.81)		1.00 (1.10)	
Light Clinical Load	1.46 (0.91)	<0.001	1.61 (0.79)	<0.001	2.11 (1.48)	<0.001
Private School	0.72 (0.58)		1.05 (0.71)		0.96 (1.23)	
Public School	1.04 (0.73)	<0.001	1.36 (0.85)	0.01	1.29 (1.24)	0.01

^aItem: “What do you consider to be a reasonable number of peer-reviewed, primary authorship publications per year from practice faculty to receive an evaluation of ‘acceptable’ for scholarship during annual review?”

^bItem: “What is the number of primary authored publications expected of practice faculty at your institution?”

^cItem: “How many peer-reviewed papers have you had published as the principle author in the last 5 years?”

in schools of pharmacy, medicine, nursing, and dentistry.⁵ The authors found that many of the barriers to scholarship for clinical pharmacy faculty were also problematic in other disciplines. Recommended solutions mirror many of those that have been proposed by others (above and below).

A fourth report from 2007 reviewed scholarly works by pharmacy practice faculty published from 2001 to 2003.¹³ Nearly 2,000 papers were published by 2,374 practice faculty, but a small proportion of faculty (2.1% of the total) published nearly 31% of all papers. The authors concluded that “[p]harmacy practice departments need to provide support and incentives so that a greater proportion of pharmacy practice faculty members contribute to their department’s scholarly totals.”

The Current Investigation

The current investigation is the largest analysis to date on the attitudes and beliefs of practice faculty towards scholarship. The 340 respondents represent 15.7% of the 2,170 membership of pharmacy practice faculty as identified in the 2006-2007 AACP Profile of Pharmacy Faculty.¹⁴ The subgroup of 255 respondents represents 11.7% of the population. Despite the limitations of survey data, and of the current instrument itself (below), a number of observations stand out.

First, and perhaps most interesting, there appears to be a large gap between expectations of the faculty members’ administration and the faculty members’ attitude towards the importance of scholarship. While administrators could narrow the gap by making their expectations clear when hiring faculty members, this alone will not address the current problem—the disconnect between faculty members’ perception of administrators’ expectations and individual faculty members’ attitudes. Practice faculty members who believe that scholarship is overemphasized, such as the 41% of the respondents in this survey, may not be motivated to participate in grant writing seminars, research methods courses, and the like, especially if they believe they have insufficient time. Their priorities appear to lie elsewhere.

Second, the belief expressed by our respondents that scholarship is overemphasized for advancement appears to run counter to ACPE requirements for accreditation.⁴ The following ACPE statements address scholarship:

- Faculty must possess the required professional and academic expertise, have contemporary knowledge and abilities in current educational philosophy and techniques, and be committed to the advancement of the profession *and the pursuit of research and other scholarly activities*. (Standard No. 25, emphasis added).

- Faculty should generate and disseminate knowledge through scholarship. Scholarship, including the scholarship of teaching, should be evident and demonstrated by productive research and other scholarly activities, such as contributions to the scientific, professional, and educational literature; publication of books and review articles; and successes in securing extramural funding to support research and other scholarly activities. The college or school must foster an environment that encourages contributions by the faculty to the development and transmission of knowledge. . . . (Guideline 25.8).

It is not clear if these statements are intended to apply to all faculty members in all schools and colleges of pharmacy. One may infer from the responses summarized earlier that if ~60% of employers require scholarship for advancement, then scholarship is *not required* for advancement at 40% of the respondent institutions. The implications of this observation with respect to ACPE accreditation standards requires further investigation and discussion among pharmacy organizations and accreditation associations.

Third, insufficient time to engage in scholarship was described as the main obstacle to greater participation, perhaps not surprising given the heavy clinical teaching/service responsibility of most respondents to the survey. It is not possible to determine from these data if faculty in fact do not have sufficient time for scholarship, or whether they choose to spend their time teaching and in other activities instead of scholarship. Perhaps not surprising, faculty with heavy clinical service/teaching responsibility (≥ 6 months/year) were significantly less likely to regard scholarship as important for advancement. And the heavy didactic and clinical teaching/service responsibilities reported by many respondents to this survey tends to support the argument that it is difficult to find time for scholarship, especially if one is not academically prepared, has little support, or is not inclined.

Fourth, it also seems clear that, even if additional time were available for scholarship to the motivated faculty member, additional resources would be needed for faculty to use this time productively. The most common recommendation from faculty to schools of pharmacy and to AACP leadership was to provide assistance to “identify a research question and how to answer it.” Unfortunately, this question may have been ambiguous as it addresses 2 somewhat unrelated issues: *identification* of a research problem and *how to answer it*. Consequently, it is not clear if the respondents wished assistance in one or both of these areas. Nevertheless, the committee is of the

opinion that simply identifying an appropriate research question is a substantial barrier to research for many practice faculty members. Identifying a research question, including the research opportunities within a clinical practice setting or in the classroom, may require experienced mentors as these opportunities may not be immediately obvious. Formal coursework in study design, biostatistics, and grant writing were all identified with similar frequency as desired by clinical faculty, at least among those who desire to become more productive in scholarship.

Fifth, there was narrow range in the number of annual publications that practice faculty believed were a reasonable expectation. Between 0.5 and 1 publications per year was considered reasonable by 200 of 255 respondents (78%), and much of the variability in responses could be explained by tenure status and clinical teaching/service responsibilities. These data may provide guidance to schools and department chairs who are interested in quantifying publication numbers and setting guidelines and expectations.

Finally, there were a number of potentially important issues that are buried in the responses to various questions (Tables 2-7). Many of these significant differences may be worth additional investigation to gain insight into attitudes toward scholarship that are of long-term relevance to the academy.

Limitations of the Survey

These data suffer from all the limitations and potential biases of most surveys, including (1) *undercoverage* (the population sampled is not as broad as the population that we desired to sample); (2) *selection bias/nonresponse bias* (respondents tend to be those who feel most strongly); (3) *untruthful answers*; and (4) *statement of questions* (subtle differences in phrasing of the question may make large differences in the results).¹⁵ It is worth considering how these limitations have likely affected the current survey.

With respect to *undercoverage*, the response rate should be at least 50% of the target population to avoid response bias and nonresponse error.¹⁶ Although the survey sample in this investigation is relatively large, *selection bias* in responses is very likely. Respondents to this survey likely care about this issue to a greater extent than those who did not respond, and consequently the survey responses are not likely to accurately reflect the population of practice faculty. The degree of this bias, however, is unknown. As a related limitation, we also do not know the number or characteristics of the schools and colleges of pharmacy represented by this survey, a result of protecting the anonymity of survey respondents.

Another limitation regarding *statement of questions* reflects the suboptimal wording of some questions that became apparent in hindsight. For example, responses to the question "Approximately how many hours of lectures and/or classroom instruction do you give in the School each year?" probably resulted in responses that reflect a mix of lecture hours, conferences, and small group discussions. This question could have been phrased more narrowly, and the observed results are likely to overstate the actual number of lecture hours given by practice faculty.

Similarly, we purposefully defined scholarship and research broadly, expanding on Boyer's approach, because we believe that this definition is in greatest use in pharmacy practice departments.¹² By doing so, however, we have likely influenced the survey results. For example, a faculty member who is expected to publish review articles or book chapters as evidence of scholarship may not need or want grant writing courses or funding opportunities, although they would have ranked these items in the survey because these were the available choices. This faculty member will perceive a lack of time as the main barrier, and there is little that AACP or the pharmacy profession can do to remedy this. In contrast, the faculty member who wishes to engage in practice-based research may see different obstacles to scholarship and have different recommendations to overcome these barriers. Whereas insufficient time may still be identified as a barrier, this faculty member may also wish access to collaborators with outcomes experience, or may need courses in outcomes methodology and statistical methods unique to practice-based research. Consequently, the heterogeneity of faculty attitudes and perceived needs in this survey is likely to be partly responsible for the heterogeneity of responses to questions that attempt to identify barriers to scholarship as well as recommendations to overcome these barriers (Tables 2-5). Although this survey attempted to assess perceived barriers to scholarship and the needs of faculty researchers, clearly there is much heterogeneity in attitudes, in part because of the broad definition of scholarship used in this survey.

Finally, because respondents did not come from a random sample of schools and colleges of pharmacy, one cannot conclude that the comments are an accurate measure of the proportion of all schools and colleges of pharmacy. For example, 60% of respondents stated that scholarship was required for advancement *at their institutions*, but this cannot be taken as a reflection of the proportion of schools and colleges that require scholarship for advancement. There are undoubtedly other threats to internal and external validity in the responses that are less obvious.

Recommendations

The committee believes that the survey responses speak broadly to the 4 committee charges and provide a reasonable set of recommendations to address the needs of practice faculty. However, there appears to be substantial heterogeneity among practice faculty with respect to individual needs and recommendations, and faculty will likely be best served at the local level by department chairs who can tailor opportunities for scholarship based on each faculty member's unique background, training, and aspirations. Training and certificate programs, such as those described below, may meet the needs of many faculty members, as may local programs in grant writing and other scholarship skills.

Additional recommendations to schools and colleges of pharmacy include (1) establishing clear expectations for scholarship when hiring practice faculty; (2) explicitly stating scholarship expectations to current practice faculty; and (3) providing the infrastructure to support scholarship (eg, protected time when appropriate, starter funds for good scholarship ideas, mentors and research-support personnel such as biostatisticians, and funds needed to achieve scholarship goals). In addition, there appears to be a strong need, especially among younger faculty, for help in identifying research questions. Early education in scholarship thinking, including how to identify a research question, should receive increased emphasis during training, including residency training. The ASHP Accreditation Standards for PGY1 Pharmacy Residencies (effective July 2008) regard training in research as an elective activity.¹⁷ On the other hand, the ACPE requirement for increased emphasis in research and scholarship in the professional program suggests that in the near future a student entering a PGY1 residency will have more training and scholarship experience than current graduates.⁴ Future PGY1 residents may be better prepared and expect a more rigorous scholarship training experience.

Several developments in pharmacy organizations have focused greater attention on the scholarship and research needs of clinical practice faculty. For example, the American Society of Health Systems Pharmacists (ASHP) recently announced plans for a research "boot camp."¹⁸ Likewise, the ACCP has announced availability of a research certificate program through the ACCP Academy.¹⁹ AACP leadership may wish to consider either a partnership with the organizations to expand these opportunities or develop independent programs.

The committee also believes that previous task forces have made sound recommendations that deserve repeating. The ACCP Research Affairs Committee identified the following conditions necessary for increasing the numbers of qualified research pharmacy faculty by the

year 2030: (1) adequate and protected time and resources for faculty; (2) mentorship; (3) a critical mass of research faculty members in each institution; and (4) support for multidisciplinary collaboration. The committee also made, 9 recommendations to the "Profession of Pharmacy," including 2 that address the needs of practice faculty: (1) "Provide adequate resources within academic pharmacy practice departments to develop a critical mass of clinical pharmacy scientists" and (2) "Develop mentoring programs within colleges of pharmacy that provide junior faculty with the necessary infrastructure and research support to foster their success." The Research Affairs Committee presented 7 recommendations to ACCP, all of which are relevant to our committee's charges: (1) promote accreditation of research programs to increase quality and decrease variability; (2) partner with residency programs to increase fellowship recruitment; (3) support training programs for junior and mid-career investigators; (4) develop a research mentor network; (5) support clinical pharmacy centers of excellence; (6) promote and support sabbaticals; and (7) monitor the state of clinical pharmacy research over time.

The preceding comments and recommendations assume that increased scholarship is a desired outcome for all schools and colleges of pharmacy, but scholarship appears to be a low, or even a nonexistent, priority in some institutions. The committee believes that this issue should be taken up by the national organizations and debated. Guidelines from such organizations could go a long way towards providing needed clarity in what appears to be a confusing issue for many schools and their faculty members.

Conclusion

The survey sample of approximately 250 pharmacy practice faculty identified a lack of sufficient time as the major obstacle to scholarship, consistent with previous surveys. There were no demographic differences among respondents on this perceived barrier to scholarship. A lack of collaborators was also perceived as a barrier, as was a lack of funds and coursework in scholarship, but these were less important than lack of time. Global recommendations from respondents to AACP leadership and to schools of pharmacy were similar and included grant writing courses, help in learning how to identify and answer research questions, and help in learning how to identify funding sources. However, the perceived barriers to scholarship and the recommendations to overcome these barriers depended on the demographics of the respondent and their attitude toward the importance of scholarship. While 60% of respondents reported that scholarship was required for advancement at their institutions, only 32% believed that scholarship should be required. Programs to

improve training and to provide mentorship and funding opportunities for scholarship are likely to help some faculty members. However, these programs are not likely to help address the lack of time or motivation for scholarship among many practice faculty members who responded to this survey.

ACKNOWLEDGEMENTS

Norman Carroll, Professor of Pharmacy at Virginia Commonwealth University, reviewed the draft questionnaire and provided valuable insights.

A preliminary report of this survey was presented at the 2007 AACP annual meeting.

REFERENCES

1. Kinnard WJ, Miya TS, Weaver LC, et al. Faculty scholarship and research: their importance to the future of pharmacy education. The 1980 AACP Argus Commission Report. *Am J Pharm Educ.* 1980;44:393-404.
2. The American Association of Colleges of Pharmacy (AACP), Commission to Implement Change in Pharmaceutical Education, "The responsibility of pharmaceutical education for scholarship, graduate education, fellowships, and postgraduate professional education and training,". *Am J Pharm Educ.* 1993;57, 386-99.
3. Leslie SW, Corcoran III GB, MacKichan JJ, et al. Pharmacy scholarship reconsidered: The report of the 2003-2004 research and graduate affairs committee. *Am J Pharm Educ.* 2004;68:Article S6.
4. Accreditation Council for Pharmacy Education (ACPE): Accreditation standards and guidelines for the professional program in pharmacy leading to the doctor of pharmacy degree, effective: July 1, 2007. Available at: <http://www.acpe-accredit.org/standards/default.asp> Accessed February 10, 2009.
5. Smesny A, Williams J, Brazeau G, Weber R, Mattheres H., Das S. Barriers to scholarship in dentistry, medicine, nursing, and pharmacy practice faculty. *Am J Pharm Educ.* 2007;71:Article 91.
6. Pickard AS. Towards supporting scholarship in research by clinical pharmacy faculty. *Pharmacy Practice.* 2006;4:191-4.
7. Fagan SC, Touchette D, Smith JA, et al. The state of science and research in clinical pharmacy. *Pharmacotherapy.* 2006;26:1027-40.
8. Calligaro ILS, Hutchinson RA, Hermann D, Rucker DT, Batenhorst RL. Pharmacy research in academic institutions. *Am J Pharm Educ.* 1991;55:40-5.
9. Jungnickel PW. Scholarly performance and related variables: A comparison of pharmacy practice faculty and departmental chairpersons. *Am J Pharm Educ.* 1997;61:34-44.
10. Schwartz MA. Academic pharmacy 1986: Are clinical pharmacists meeting the clinical scientist role?. *Am. J. Pharm. Educ.* 50: 462-4.
11. Evans W.E. Academic research fellowships in clinical pharmacy. *Am J Pharm Educ.* 1986;50:485-7.
12. Boyer EL. Scholarship Reconsidered: Priorities of the Professoriate Lawrenceville, NJ: Princeton University Press; 1990.
13. Coleman CI, Schlesselman LS, Lao E, White CM. Number and impact of published scholarly works by pharmacy practice faculty members at accredited US colleges and schools of pharmacy (2001-2003). *Am J Pharm Educ.* 2007;71:44
14. American Association of Colleges of Pharmacy, 2006-2007: Profile of pharmacy faculty. Available at: http://www.aacp.org/Docs/MainNavigation/InstitutionalData/7813_SCANNER94_1015_000.pdf. Accessed January 30, 2009.
15. Fowler FJ. Survey Research Methods. 3rd ed. Thousand Oaks, CA: Sage Publications; 2002.
16. Draugalis JR, Coons SJ, Plaza CM. Best practices for survey research reports: A synopsis for authors and reviewers. *Am J Pharm Educ.* 2008;72 Article 11.
17. Required and Elective Educational Outcomes, Goals, Objectives, and Instructional Objectives for Postgraduate Year One (PGY1) Pharmacy Residency Programs, 2nd Edition – effective July 2008. Available at: <http://www.ashp.org/Import/ACCREDITATION/ResidencyAccreditation/RegulationsStandards.aspx>. Accessed February 10, 2009.
18. ASHP Foundation: Research boot camp. Available at: <http://www.ashpfoundation.org/MainMenuCategories/ResearchResourceCenter/FosteringYoungInvestigators/ResearchBootCamp.aspx>. Accessed January 30, 2009.
19. College launches the ACCP Academy. Available at: <http://academy.accp.com/>. Accessed January 30, 2009.