

Development of Behavioral Science Curricula and Faculty in Pharmacy: Some Issues Requiring Attention¹

Bonnie L. Svarstad

School of Pharmacy and Department of Sociology, University of Wisconsin-Madison, Madison WI 53706

The purpose of this paper is to summarize advances in behavioral research related to drug therapy and assess the development of behavioral science curricula and faculty in pharmacy schools. Procedures include a Medline search of articles on patient compliance and quality of life, a review of behavioral science and communication courses in the AACP Curriculum Database, and analysis of the AACP *Roster of Faculty and Professional Staff*. Findings indicate a dramatic increase in research over the past 20 years and some progress in the development of behavioral science curricula and faculty. However, there is wide variability in curriculum development and faculty availability across pharmacy schools, and a number of schools still do not have any full-time teachers in the social or administrative sciences. Some changes that might facilitate the development of behavioral science curricula and faculty are proposed.

INTRODUCTION

It has been almost 20 years since the Study Commission on Pharmacy(1) called attention to pharmacy's need for behavioral science knowledge and 15 years since the first AACP forum devoted to the emerging field that is now called *social and behavioral pharmacy* (2-4). Social and behavioral pharmacy is the interdisciplinary field concerned with the development and application of social and behavioral science knowledge and techniques to problems in pharmacy and drug use. It builds on theory and techniques from sociology, psychology, and other basic and applied behavioral sciences and is focused on the psychosocial aspects of drug therapy and pharmaceutical care, communication with patients and other caregivers, professional education and clinical decision-making, and the drug use process. This distinguishes it from pharmacy economics, pharmacy and health care management, and other fields that emphasize the economic aspects of drug therapy and pharmaceutical care, pharmacy operations, and the management process.

While the Study Commission on Pharmacy urged colleges of pharmacy to give greater emphasis to the behavioral sciences, it did not define what should be included in a model behavioral science curriculum. Nor did it address the many barriers to developing behavioral science curricula and faculty in pharmacy schools during the 1970s. At the time, only two pharmacy schools (University of Minnesota and University of Wisconsin) offered MS and PhD programs that focused on the social and behavioral aspects of pharmacy, and support for faculty development in the pharmaceutical behavioral sciences was virtually nonexistent. A similar situation existed in medical schools where organized programs in behavioral medicine were only beginning to appear.

The fields of medical sociology and health psychology were expanding at a rapid rate in the 1970s, but there was not yet an adequate behavioral knowledge base focused specifically on medication misuse(2-4). Research on patient non-compliance was in its infancy; the importance of behavior

and behavioral change to treatment success was not well documented; and concerns about quality of life and other psychosocial aspects of drug therapy were only beginning to surface. Also lacking was a broad consensus regarding the pharmacist's role in patient counseling and other functions that require a more sophisticated understanding of human behavior and strategies for effecting behavioral change.

Pharmacy now has a clear societal mandate to counsel patients and assume greater responsibility for monitoring and improving the quality of drug use(5). The AACP Commission to Implement Change in Pharmacy Education also has reaffirmed pharmacy students' need for behavioral science knowledge and better opportunities to develop the communicative and interpersonal skills that are the cornerstone of pharmaceutical care(5, 6). It is important therefore to reflect on the state of behavioral research related to drugs and the development of behavioral science curricula and faculty in pharmacy schools.

Three types of data will be presented in the sections that follow. Data from a Medline search are used to illustrate the growth of research on the psychosocial and behavioral aspects of drug therapy over the past two decades. This discussion is followed by a review of behavioral science and communication courses described in the AACP Curriculum Database and a review of information contained in the 1992-93 AACP *Roster of Faculty and Professional Staff*. Unresolved issues and suggestions regarding the development of behavioral science curricula and faculty are discussed in the final section of the paper.

ADVANCES IN BEHAVIORAL RESEARCH RELATED TO DRUGS

Over the past 20 years, medication use has become a topic of concern to scholars in medicine, pharmacy, the behavioral sciences, and public health. In surveying this vast literature, several points stand out.

¹ Presented in part at the annual meeting of the American Association of Colleges of Pharmacy, San Diego CA, July 11, 1993.

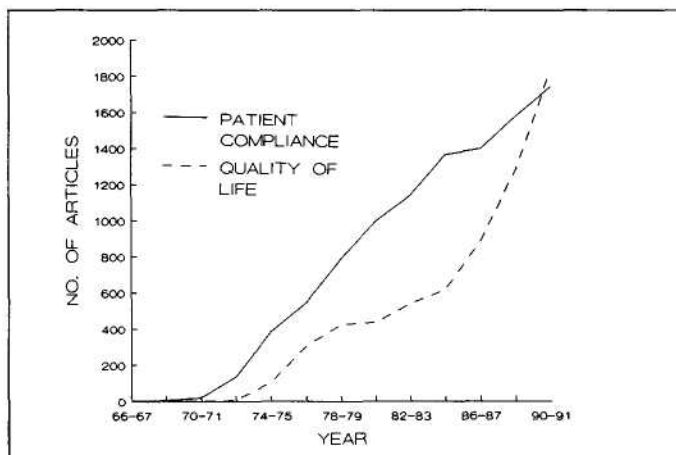


fig. 1. Published articles on patient compliance and quality of life, 1966-1991.

Emergence of Work on Patient Noncompliance and Quality of Life. Two of the most frequently studied topics in recent years are patient noncompliance with prescribed regimens and impact of various pharmacologic and nonpharmacologic interventions on the patient's quality of life. To illustrate the steady growth and vitality of research in these areas, a Medline search was conducted using the terms "patient compliance" and "quality of life".

Figure 1 shows the emergence of published articles on these subjects from 1966-67 to 1990-91. We see that the literature in both areas was almost nonexistent in the late 1960s and early 1970s. The number of published articles then increased steadily each year until 1990-91, when approximately 3,500 titles or abstracts mentioned one of these topics. It was not possible to determine the exact number of publications related to drug therapy, but it is clear that drug therapy is the topic of concern in a majority of publications.

Importance of Patient Behavior. The significance of patient noncompliance is now well-documented in many clinical trials and virtually all medical specialties and patient populations⁽⁸⁾. Doubts about the clinical importance of patient behavior have been dispelled by numerous studies documenting the consequences of poor compliance in terms of cardiovascular morbidity and mortality⁽⁸⁾, vision loss⁽⁹⁾, rejection of transplanted kidneys⁽¹⁰⁾, seizure frequency⁽¹¹⁾, leukemia relapse⁽¹²⁾, and other indicators of treatment failure. Experts also have identified patient compliance as a source of variation in pharmacokinetics and therapeutic drug monitoring, raising other concerns among those who rely on serum drug concentrations as a guide to dosing⁽¹³⁾.

Empirical Versus Scientific Approaches to Patient Counseling. After the problem of patient noncompliance was discovered in the early 1970s, a number of clinical researchers in medicine, pharmacy, and other fields attempted to correct the problem. A few investigators used scientific approaches, basing their hypotheses or interventions on existing theory and findings from the basic and applied behavioral sciences. Most investigators, however, adopted empirical approaches to the development of their hypotheses or interventions.

Empirical approaches are defined as approaches that rely solely on practical experience or trial and error methods without reference to scientific principles or theory. Like physicians who practiced empirical prescribing, early clinical researchers practiced empirical counseling. In other

words, they relied on practical experience or trial and error methods when trying to improve compliance in their practices. Whether they were aware of relevant behavioral theory is not important. The point is that they simply assumed that patients needed more information or education and then proceeded to design various educational or counseling strategies without a reference to behavioral science theory or principles.

Early efforts using empirical approaches produced some interesting results, but they also yielded many negative or inconsistent findings about the effects of information and education^(14,15). The realities of patient noncompliance soon became clear: it can be very difficult to measure objectively, cannot be eliminated by information or education alone, and can fluctuate from one situation or time period to another.

Interest in behavioral theory and techniques has increased considerably in recent years. While many questions remain unanswered, remarkable progress has been made. Behavioral models of compliance have been developed to guide research, organize findings, and help practitioners understand the causes and dynamics of patient decision-making and behavior⁽¹⁶⁻¹⁹⁾; more sophisticated methods of classification, measurement, monitoring, and statistical analysis have become available⁽⁷⁾; and there is now a richer array of intervention programs, strategies, and devices for addressing the different steps involved in stimulating and maintaining behavioral change and patient satisfaction with their treatment and quality of life^(20,21).

These newer strategies for assessing and affecting patient compliance certainly require further refinement and do not address all of the psychosocial and behavioral issues of concern to pharmacy. However, they constitute the beginning of a *behavioral pharmacy technology* that might have a profound effect on the nature and impact of pharmaceutical care if implemented widely. This means that empirical approaches to patient counseling and compliance management must be replaced by more rational, systematic approaches that are based on scientific principles.

Empirical Versus Scientific Approaches to Improving Drug-Therapy Decisions. While the bulk of research pertains to patient compliance, we can anticipate similar challenges as pharmacists assume greater responsibility for assessing and affecting physician and nurse compliance with drug use standards or peer review criteria^(22,23). Indeed the emerging literature in this area already suggests that empirical approaches to improving drug-therapy decisions will be less effective than approaches based on behavioral theory and techniques^(24,25).

It is important to recognize that noncompliance is a generic problem that can occur at different points or levels throughout the drug use process. Patients have difficulty complying with drug regimens; physicians, nurses, and pharmacists have difficulty complying with new standards of care; nursing homes have difficulties complying with new regulatory codes; and so forth. Behavioral theory and techniques can be adapted and applied to each of these problems.

DEVELOPMENT OF BEHAVIORAL SCIENCE CURRICULA IN PHARMACY

It is difficult to assess the extent to which behavioral science curricula have been developed in schools of pharmacy,

because there are no published studies. To assess progress in this area, the AACP Curriculum Database was examined. Advantages of this database are that it includes a listing of all courses required by a given school, brief course descriptions, number of hours allocated to lecture versus laboratory or discussion, and one or more keywords that define course emphasis. A major limitation is that it includes current data from only 33 schools. Fortunately, the sample includes schools of varying sizes, geographic locations, and curriculum type (BS only; PharmD only; both BS and PharmD). My search focused on two keywords in the database: "psychosocial aspects" (code 35) and "communications" (code 8). Also examined was each school's full listing of required courses, clerkship offerings, and selected management courses that might consider the social and behavioral aspects of patient care. This exercise yielded several additional courses that emphasized the social, behavioral, or communicative aspects of patient care. Data regarding pre-pharmacy requirements and elective courses will not be summarized, because data were not adequate.

Behavioral Science Principles and Laboratory. Of those schools in the AACP Curriculum Database, 36 percent (n=12) required a foundation course with primary emphasis on psychological or social principles related to patient care (code 35 or equivalent). How many courses included an experiential component is not known, but only three courses included formal discussion hours or a laboratory in which students might gain hands-on experience in analyzing or solving problems of a social, psychological, or behavioral nature. Courses generally were taught by PhD level faculty and were given titles such as behavioral pharmacy, sociobehavioral pharmacy, sociology of pharmacy, and social and administrative pharmacy.

Professional Communication Skills and Theory. The next step involved examination of communication course descriptions in order to determine whether communication was given primary or secondary emphasis and whether communication theories or principles were mentioned. Courses in which communication was given secondary emphasis generally mentioned distributive functions or technical aspects of drug therapy before mentioning information or communication.

The data revealed wide variability in course requirements, course emphasis, and faculty background. Approximately 27 percent (n=9) of the schools listed no course requirements in this area and 24 percent (n=8) listed a course with secondary emphasis only. Six schools (18 percent) required course(s) with primary emphasis on professional communication, but did not mention communication theory or principles. The remaining 30 percent (n=10) required a course with primary emphasis on communication theory and skill development.

Formal discussion groups or laboratories were evident in 15 of 24 courses with a primary or secondary emphasis on communication. Missing information made it difficult to determine who had instructional responsibility, but it is clear that these courses are now taught in multiple departments by faculty with varying types and levels of formal preparation for teaching communication skills.

Given the diversity of instructors, we should not be surprised by the different approaches and topics that were mentioned. Generally speaking, there seemed to be two

approaches—a drug-centered approach and a person-centered approach.

Courses with a drug-centered approach focused primarily on the dissemination of drug information with some attention given to interviewing skills. Courses with a person-centered approach focused primarily on interpersonal communication and addressed a broader range of topics. Common topics were: dynamics of patient-pharmacist interaction and interprofessional communication, verbal and non-verbal communication techniques, listening and response styles, traditional and innovative methods of patient education, compliance monitoring and enhancement strategies, methods of patient activation and empowerment, and assertiveness.

Several courses addressed various social, psychological, and environmental barriers to effective communication. However, none of the schools required courses that focus specifically on methods of analyzing and changing communication systems, structures, environments, or programs. In other words, none of the required communication courses was system-centered or practice-centered.

Teaching Social and Behavioral Pharmacy at the Practice Site. While patient counseling and monitoring skills are addressed in various externship and clerkship programs, the AACP Curriculum Database does not contain enough information to evaluate how these issues are addressed in such programs.

The rich array of advanced or specialty clerkships that focus on various medical conditions or organ systems and the virtual absence of clerkships that focus on the social or psychological aspects of patient care is striking, however. The exception was a school that required a supervised practice experience emphasizing advanced communication skills. In this particular case, students are supervised by a faculty member with a PharmD and PhD in psychology. There are enormous opportunities for innovative and collaborative teaching along these lines.

Curriculum Intensity and Integration. Consistent with earlier findings, we noted wide variation in curriculum intensity or the total number of required lecture, laboratory, and discussion hours devoted primarily to psychosocial and communicative aspects of care. The combined number of hours in these particular areas ranged from 0 to 90, with a mean of 30.5 hours.

The database does not allow us to determine level of integration across the physical, biological, administrative, and behavioral sciences. However, it is clear that the overwhelming majority of schools have not yet developed an integrated behavioral science curriculum.

An integrated behavioral science curriculum is defined as a program that provides students with: (i) a *scientific foundation* in behavioral science theory and technology related to pharmaceutical care, research, and education (including communication theory); (ii) preclinical experiences that develop a range of *behavioral skills*; and (iii) supervised practice experience that promotes and integrates the learning of behavioral science and caregiving at the practice site.

When these criteria were applied, we found one school that required all three components (scientific foundation + behavioral skill development + integrative practice). Three schools (9 percent) required two components, 61 percent

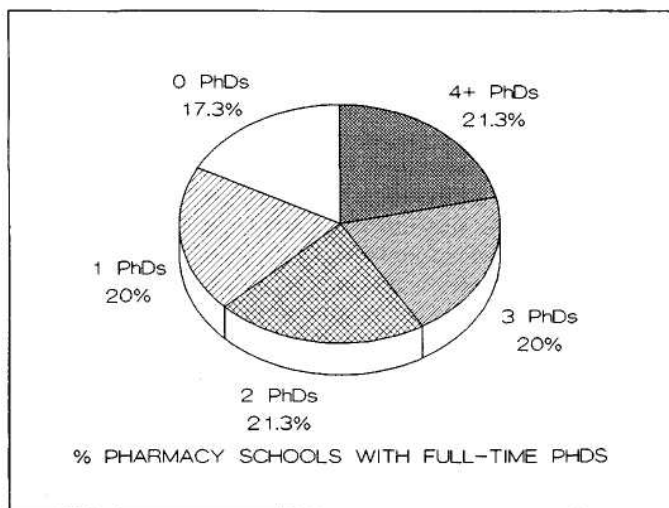


Fig. 2. Distribution of full-time PhD social and administrative science teachers in U.S. pharmacy schools, 1991-92.

(n=20) required one component, and 27 percent (n=9) required none of these components.

In sum, we see some progress in development of behavioral science curricula. However, there is wide variability in curriculum development across pharmacy schools and a lack of integration overall. Before commenting further, let us examine the availability of faculty in this area.

DEVELOPMENT OF BEHAVIORAL SCIENCE FACULTY IN PHARMACY

Over the years leading educators have called on pharmacy deans and their faculties to bring together a critical mass of well-qualified faculty to establish quality teaching and research programs in the social and administrative sciences(6, 26-27). It appears that a number of deans have made a serious attempt to build breadth and depth in these disciplines, while others have not yet made this commitment. Again, we lack published studies.

To assess progress in this area, the 1992-93 AACP Roster of Faculty and Professional Staff was analyzed. A recent report by Trinca and Meyer(28) and an unpublished survey by Wiederholt and Kirk(29) also were reviewed. The Wiederholt and Kirk survey was sent to social and administrative science faculty members in all U.S. and Canadian pharmacy schools. My secondary analysis focused on a single, open-ended question that asked respondents to describe their primary research interests. Data were available for 174 faculty in 67 U.S. schools.

The AACP Roster is useful, because it lists each school's full-time and part-time faculty and basic information about each faculty member (title, highest degree, general area of expertise). A major limitation of the Roster is that it lumps all social and administrative science educators under one broad category termed pharmacy administration. Thus, it is not possible to conduct a detailed evaluation of faculty qualifications, interests, or teaching responsibilities. We also cannot determine whether faculty obtained their highest degree in a basic social science (e.g., economics, psychology, sociology) or an applied social science (e.g., educational psychology, pharmacy management). Nor can we determine their field of specialization (e.g., pharmacy economics, pharmacy management, or social and behavioral pharmacy).

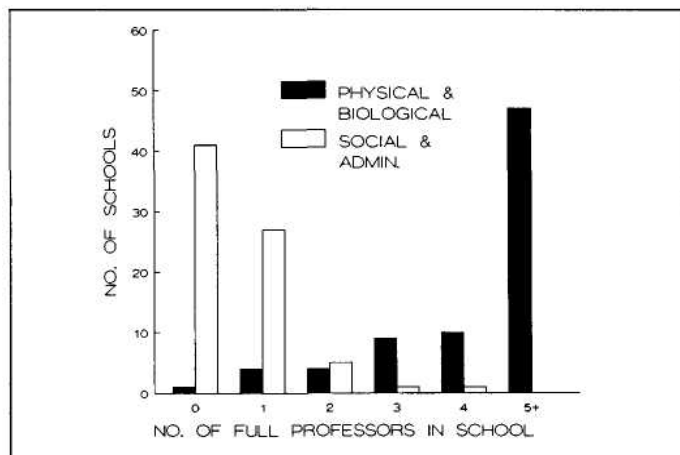


Fig. 3. Distribution of full professors in basic pharmaceutical sciences, 1991-92.

With this cautionary note in mind, let us examine several general trends that may be of interest.

Formal Training and Appointment. There is a surprising number of faculty who do not have a PhD degree or a full-time appointment. Of 362 faculty grouped under the broad category of pharmacy administration, 42 percent do not have a PhD degree and 22 percent do not have a full-time appointment(28).

Distribution and Critical Mass. The total number of social and administrative science teachers varies widely from one school to another. According to my analysis of the AACP Roster, 17 percent of the schools do not have a single, full-time PhD level teacher in any of the social or administrative sciences (Figure 2). In 41 percent of the schools, faculty must work alone or with one other PhD level faculty. On the positive side, we see that 21 percent (n=16) of the schools now have at least four PhD level teachers in one or more disciplines.

Experience. The virtual absence of experienced faculty is striking. The AACP Roster showed that 41 schools (55 percent) do not have a single full professor in any of the social or administrative sciences and that only 7 schools (9 percent) have two or more teachers at this rank (Figure 3).

The reverse is true for the physical and biological sciences, as many readers know. Of 75 schools, 63 percent (n=47) have 5 or more full professors in the physical and biological sciences and only a few new schools lack physical and biological science faculty at the rank of full professor.

Area of Specialization. Secondary analysis of data collected by Wiederholt and Kirk(29) showed that only 20 percent of the faculty who responded to their survey had primary research interests in the social and psychological aspects of pharmaceutical care and drug use. In other words, the number of teachers with scientific training and interest in social and behavioral pharmacy has grown over the past 15 years but remains relatively small in comparison to other fields.

This has obvious implications for pharmacy's ability to contribute to (and stay in touch with) broader developments in behavioral theory and knowledge related to health, research techniques, and methods of health promotion and behavioral change. It also limits pharmacy's ability to stay in

touch with (and contribute to) parallel developments in the teaching of behavioral medicine, as will be discussed later.

Relationship Between Faculty Resources and Curriculum Development. We generally assume that good faculty resources are necessary to implement significant change or innovation in education. However, it might be helpful to examine the facts. To address this matter, data from the faculty and curriculum databases were merged.

This analysis confirmed a positive association between number of full-time social and administrative science teachers and development of behavioral science curricula, as measured by the presence of a behavioral science foundation course and total number of hours required in courses with a primary emphasis on psychosocial or communicative aspects of patient care. The average number of required hours in these areas ranged from 17 hours (in schools with 0-1 full-time teachers) to 42 hours (in schools with four or more teachers). This does not include elective or graduate courses offered in schools with behavioral faculty.

In conclusion, a number of schools have succeeded in developing their social and administrative science faculty and, as a result, have made some headway in development of their behavioral science curricula. Other schools clearly lack faculty with the types of training, interest, collegial support, and experience that are necessary to develop innovative, science-based teaching programs in this area.

UNRESOLVED ISSUES AND SUGGESTIONS FOR THE FUTURE

Where do we go from here? What unresolved issues must be addressed if the field of social and behavioral pharmacy is to have a significant impact on pharmaceutical care? Two types of issues might be considered. The first set of issues relates to behavioral science curricula and experiential learning. The second set relates to development of faculty and faculty standards.

RETHINKING BEHAVIORALSCIENCE EDUCATION AND EXPERIENTIAL LEARNING

Lack of Curriculum Development and Standards. The AACP curriculum database yielded both bad and good news with regard to curriculum development. On the negative side, recall that 64 percent of the schools in the database did not require a foundation course in the social and psychological aspects of pharmacy and that 52 percent of the schools did not require a course in which pharmacy communication was given primary emphasis. It is time to develop and promote higher standards for behavioral science education in pharmacy.

Methods of Teaching and Assessing Behavioral Skills. The good news is that pharmacy faculty have developed new courses, teaching methods, and methods of assessing students' behavioral competencies and attitudes related to interviewing, counseling, and compliance enhancement(22, 30-34). These experiences might be helpful to other faculty who wish to broaden their overall approach, introduce new topics, or explore new evaluation techniques.

Objective, outcome-based evaluation of student performance is especially critical, because some approaches to counseling education can enhance students' confidence without enhancing their behavioral competency. For example, Magarian and his colleagues(35) evaluated the effects of a

four-day ambulatory care training program conducted by professional practice faculty in pharmacy, nursing, and nutrition. On the positive side, pharmacy students reported more confidence in their communication skills as a result of training. Unfortunately, the program did not improve students' ability to gain patient compliance, possibly because it did not address all the steps required for behavioral change.

Learning Behavioral Science in Laboratory and Practice Settings. Another encouraging sign is that a number of schools have begun to replace fact-based approaches with theory-based approaches to behavioral pharmacy education. Those schools with theory-based foundation courses are now in an excellent position to take the next logical step—development of strategies that promote and integrate the learning of behavioral science and caregiving at the practice site. Two types of changes might be considered.

The first of these changes is the development of *behavioral science laboratories* that challenge our students to test their common sense theories against established scientific theories of information-processing, risk counseling, and behavioral change in health care contexts. Students must discover for themselves the limitations of empirical counseling, just as they must discover the limitations of empirical prescribing.

Second, more thought must be given to learning advanced behavioral skills and techniques at the practice site. Especially lacking are practice experiences that focus primarily on the detection, diagnosis, monitoring, and management of compliance problems in different patient care environments (and clinical trials).

Also needed are practice experiences that enable pharmacists to design (and evaluate) their own counseling practices and to cope more effectively with the sociocultural and structural barriers to effective counseling and change in noninstitutional practice settings(36, 37). Knowing how to analyze and cope with traditional patient-pharmacist-physician roles and communication networks may be as important as knowing how to conduct a medication history or give appropriate drug information, for example.

This type of practice experience might be called a *behavioral pharmacy clerkship*. While this type of experience might take many forms, it should be: problem-oriented, person-centered, theory-based, collaborative with practitioners and managers, and located at practice sites where psychosocial and behavioral problems are known to be more complex or difficult to solve.

Educational planning might begin with a review of parallel efforts that are underway in behavioral medicine. For example, behavioral science educators have developed and tested some creative methods of teaching behavioral theory and biopsychosocial care to medical students, residents, fellows, and practicing physicians(38-48). Many of these techniques are relevant to pharmaceutical care and might be adapted for use in behavioral pharmacy laboratories and clerkships.

RETHINKING FACULTY PREPARATION AND STANDARDS

Faculty Development Strategies. In the past, some have suggested that schools should provide opportunities for pharmacy administration faculty to retool or shift the direction of their work to address new needs(27). This strategy

seems unwise as it assumes a surplus of experienced faculty in pharmacy management, an assumption that does not fit the data presented earlier.

An alternative is to design and implement a variety of fellowships designed specifically for professional practice faculty and other PharmD graduates who have demonstrated teaching or research interests in the psychosocial aspects of pharmaceutical care. We also need to rethink the mission, structure, and funding of existing PhD programs in this area.

Information about the specific needs of professional practice faculty is lacking, but the number of individuals with potential interests in this area is encouraging. For example, Boh and his colleagues(49) reported that 46 percent of all clerkship coordinators are interested in educational research and that 22 percent are interested in social and behavioral research. Perhaps the time has arrived to tap (and develop) these special interests and commitments.

Recruitment of Established Behavioral Scientists. Schools without experienced PhD level faculty in the field of social and behavioral pharmacy also might consider recruitment of established behavioral scientists to assist interested professional practice faculty. Specialists in health psychology, medical sociology, educational psychology, or behavioral medicine would be logical candidates. The most important qualifications to consider might be a strong background in behavioral science theory, interest in the psychosocial aspects of patient care, and commitment to innovative teaching in pharmacy.

Faculty Standards. Consideration also must be given to development (and promotion) of both quantitative and qualitative standards for faculty in the pharmaceutical social and administrative sciences. Specific criteria are needed to evaluate faculty in terms of degree type, disciplinary background, appointment type, and critical mass.

Our analysis of faculty trends suggests that a number of pharmacy schools have been operating with double standards regarding faculty in the basic pharmaceutical sciences. Faculty in physical and biological sciences are expected to have PhD level training and interests that fit their teaching responsibilities, and their departments are expected to have good breadth, depth, and leadership. It is time that similar expectations be applied to social and administrative science faculty and their departments on a uniform, nationwide basis.

CONCLUSIONS

The rigorous application of physical-chemical principles and the subsequent development and incorporation of biopharmaceutics and pharmacokinetics into the pharmacy curriculum undoubtedly had a profound effect on the evolution of pharmacy (26, 50). Academic pharmacy is now in an excellent position to take the next logical step in its evolution, that is, the full development and incorporation of the behavioral sciences into the professional curriculum. This cannot be accomplished until more attention is given to the severe shortage of appropriately trained faculty with interests in the psychosocial aspects of pharmaceutical care and drug use.

Acknowledgement. The author appreciates the suggestions from Bruce Berger, Donna Dolinsky, Jack Fincham,

Abraham Hartzema, Metta Lou Henderson, Susan Meyer, Jeanine Mount, Betsy Sleath, Joseph Wiederholt, and George Zografu.

Am. J. Pharm. Educ., **58**, 177-183 (1994); received 1/10/94, accepted 2/21/94

References

- (1) *Pharmacists for the Future: The Report of the Study Commission on Pharmacy*, Health Administration Press, Ann Arbor MI (1975).
- (2) Dolinsky, D., "Pharmaceutical psychology," *Am. J. Pharm. Educ.*, **43**, 261-266(1979).
- (3) Johnson, C.A. and Wertheimer, A. I., "Behavioral pharmacy," *ibid.*, **43**, 257-261(1979).
- (4) Svarstad, B.L., "Pharmaceutical sociology: Issues in research, education and service," *ibid.*, **43**, 252-257(1979).
- (5) Commission to Implement Change in Pharmaceutical Education. "Entry-level education in pharmacy: A commitment to change," *ibid.*, **57**, 366-373(1993).
- (6) Commission to Implement Change in Pharmaceutical Education: Background paper II. "Entry-level curricular outcomes, curricular content and educational process," *ibid.*, **57**, 377-385 (1993).
- (7) Cramer, J.A. and Spilker, B. (eds.), *Patient Compliance in Medical Practice and Clinical Trials*, Raven Press, New York NY (1991).
- (8) Urquhart, J., "Patient compliance as an explanatory variable in four selected cardiovascular studies," in *Patient Compliance in Medical Practice and Clinical Trials* (eds. Cramer, J.A. and Spilker, B.) Raven Press, New York NY (1991) pp. 301-22.
- (9) Priddy, J.T., Kass, M.A., Gordon, M.O. *et al.*, "Factors related to compliance with topical pilocarpine treatment," *Invest. Ophthalmol Visual Sci.*, **28**, 377(1987).
- (10) Didlake, R.H., Dreyfus, K., Kermman, R.H. *et al.*, "Patient noncompliance: a major cause of late graft failure in cyclosporine-treated renal transplants," *Transplant. Proc.*, **20**, 63-69(1988).
- (11) Cramer, J.A., Mattson, R.H., Prevey, M.L. *et al.*, "How often is medication taken as prescribed? A novel assessment technique," *J. Am. Med. Assoc.*, **261**, 3273-3277(1989).
- (12) Snodgrass, W., Smith, S., Trueworthy, R. *et al.*, "Pediatric clinical pharmacology of 6-mercaptopurine: lack of compliance as a factor in leukemia relapse," *Proc. Am. Soc. Clin. Oncol.*, **3**, 204(1984).
- (13) Backes, J. M. and Schentag, J.J., "Partial compliance as a source of variation in pharmacokinetics and therapeutic drug monitoring," in *Patient Compliance in Medical Practice and Clinical Trials*, (eds. Cramer, J.A. and Spilker, B.) Raven Press, New York NY (1991), pp. 27-36.
- (14) Sackett, D. L. and Haynes, R.B., *Compliance with Therapeutic Regimens*, Johns Hopkins University Press, Baltimore MD (1979).
- (15) Morris, L. A. and Halperin, J.A., "Effects of written drug information on patient knowledge and compliance: A literature review," *Am. J. Publ. Hlth.*, **69**, 47-52(1979).
- (16) Janz, N. and Becker, M., "The health belief model: a decade later," *Health Educ. Q.*, **11**, 1-47(1984).
- (17) Svarstad, B.L., "The relationship between patient communication and compliance," in *Topics in Pharmaceutical Sciences 1985*, (eds. Breimer, D. and Speiser, P.), Elsevier Science Publishers, Amsterdam (1985).
- (18) Svarstad, B.L., "Patient-practitioner relationships and compliance with prescribed medical regimens," in *Applications of Social Science to Clinical Medicine and Health Policy*, (eds. Aiken, L. and Mechanic, Rutgers University Press, New Brunswick NJ (1986), pp. 438-459.
- (19) Leventhal, H. and Cameron, I., "Behavioral theories and the problem of noncompliance," *Pat. Educ. Counsel.*, **10**, 117-138(1987).
- (20) Green, L. W., Kreutier, M.W., Deeds, S.G. and Partridge, K.B., *Health Education Planning: A Diagnostic Approach*, Mayfield Publishing, Palo Alto CA (1980).
- (21) Meichenbaum, D. and Turk, E., *Facilitating Treatment Adherence: A Practitioner's Guide*, Plenum Press, New York NY (1987).
- (22) Kimberlin, C.L., "Communications," in *Pharmacy Practice: Social and Behavioral Aspects*, 3rd ed., (eds. Wertheimer, A. and Smith, M.) University Park Press, Baltimore MD (1989) pp. 159-177.
- (23) Svarstad, B.L., "The sociology of drugs in health care," in *Pharmacy Practice: Social and Behavioral Aspects*, (eds. Wertheimer, A. and Smith M.) University Park Press, Baltimore MD (1989) pp. 197-211.
- (24) Avorn, J. and Soumerai, S.B., "Improving drug-therapy decisions through educational outreach: a randomized controlled trial of academically based 'detailing'," *N. Engl. J. Med.*, **308**, 1457-1463(1983).

- (25) Gurwitz, J.H., Soumerai, S.B. and Avorn, J., "Improving medication prescribing and utilization in the nursing home," *J. Am. Geriat. Soc.*, **38**, 542-552(1990).
- (26) Levy, G., "Preparing for pharmacy's future," *Am. J. Pharm. Educ.*, **47**, 332-334(1983).
- (27) Paul, A.G., "Pharmacy administration as a research discipline," *ibid.*, **48**, 383-384(1984).
- (28) Trinca, C.E. and Meyer, S.M., "Pharmacy administration in the United States: Education and research," *ibid.*, **57**, 70-73(1993).
- (29) Wiederholt, J. and Kirk, K., "Research directory of pharmacy administration faculty," Paper presented at annual meeting of American Association of Colleges of Pharmacy, Boston MA (1991).
- (30) Berger, B.A., Baldwin, H.J., McCroskey, J.C. and Richmond, V.P., "Implementation of a systematic desensitization program and classroom instruction to reduce comprehension apprehension in pharmacy students," *Am. J. Pharm. Educ.*, **46**, 227-234(1982).
- (31) Gianetti, V.J., "The effect of empathy training upon pharmacy student response style," *ibid.*, **50**, 261-264(1986).
- (32) Kimberlin, C.L., "Assertiveness training for pharmacy students," *ibid.*, **46**, 137-141(1982).
- (33) Ranelli, P., Svarstad, B.L. and Boh, L., "Factors affecting outcomes of medication history interviewing by pharmacy students," *Am. J. Hosp. Pharm.*, **46** 267-281(1989).
- (34) Dolinsky, D., "Teaching skills of research evaluation," *Am. J. Pharm. Educ.*, 82-86 (1994).
- (35) Magarian, E.O., Peterson, CD., McCullagh, M.E., and Kuzel, R.J., "Role model ambulatory care clinical training site in a community-based pharmacy," *ibid.*, **57**, 1-8(1993).
- (36) Sampson, E.E. and Marthas, M., *Group Process for the Health Professions*, 2nd ed., John Wiley and Sons, New York NY (1981), Chap.
- (37) Svarstad, B.L., "Communication education: Reflections on the 'iceberg effect'," *Can Patient Education Really Make a Difference?: Proceedings of United States Pharmacopeia Open Conference*, United States Pharmacopeial Convention, Rockville, 51-56(1993).
- (38) Inui, T. S., Yourtree, E.S. and Williamson, J.W., "Improved outcomes in hypertension after physician tutorials: A controlled trial," *Ann. Int. Med.*, **84**, 645-651 (1976).
- (39) Levenkron, J.C., Greenland P. and Bowley, N., "Teaching risk-factor counseling skills: A comparison of two instructional methods," *Am. J. Prev. Med.*, **6**, 29-34(1990).
- (40) Leyden, D., Cullinane, E.M., Wincze, J. *et al.*, "Teaching behavioral medicine using individual coronary heart disease risk factors," *Prev. Med.*, **16**, 269-273(1987).
- (41) Ockene, J.K., Ockene, I.S., Kabat-Zinn, J. *et al.*, "Teaching risk-factor counseling skills to medical students, house staff, and fellows," *Am. J. Prev. Med.*, **6**, 35-42(1990).
- (42) Sallis, J.F., Criqui, M.H., Kashani, I.A., *et al.*, "A program for health behavior change in a preventive cardiology center," *ibid.*, **6**, 43-50(1990).
- (43) Berolzheimer, N., Haggerty, J.J. and Cassata, D.M. "Behavioral medicine rounds: Using a biopsychosocial approach for inpatient teaching," *Fam. Med.*, **18**, 11-14(1986).
- (44) Gallagher, R.M., McCann, W.J., Jerman A. *et al.*, "The behavioral medicine service. An administrative model for biopsychosocial medical care, teaching, and research," *Gen. Hosp. Psych.*, **12**, 283-295 (1990)
- (45) Garcia, J., Rubin, S. and Leitner, D., "Promoting behavioural medicine services in cardiology among physicians in Chile," *Int. J. Rehab. Res.*, **14**, 350-353(1991).
- (46) Skinner, B., Slatt, L. and Baker, R., "Validating audiovisual reviews as a strategy for teaching behavioral medicine to primary care residents," *Fam. Prac. Res. J.*, **9**, 157-165(1990).
- (47) Zebal, B.H. and Friedman, S.B., "A nationwide survey of behavioral pediatric residency training," *J. Dev. Beh. Ped.*, **5**, 331-335(1984).
- (48) Coury D.L., Mulick, J. A., Eaton, A.P. *et al.*, "A fellowship curriculum in behavioral-developmental pediatrics," *ibid.*, **9**, 92-95(1988).
- (49) Boh, L., Pitterle, M.E., Schneider, F. and Collins, C.L., "Survey of experiential programs: Course competencies, student performance and preceptor/site characteristics," *Am. J. Pharm. Educ.*, **55**, 105-113(1991).
- Hepler, CD., "The third wave in pharmaceutical education: The clinical movement," *ibid.*, **51**, 369-385(1987).