A Project to Implement Clinical Pharmacy Practice in Rural Evironments

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CLINICAL PHARMACY PRACTICE remains poorly defined, often having different meanings for different people. Nonetheless, there seems to be some consensus that clinical pharmacy practice in the United States emphasizes the patient and the patient's needs rather than the drug substance itself. This emphasis on the patient has evolved simultaneously with institution-based practice in which the clinical pharmacist is trained in such areas as the pathophysiology of disease, pharmacokinetics, biopharmaceuticals, and drug-drug and drug-food interactions, among others. Institutional practice is certainly among the most challenging of settings because of the number of cases of rare diseases, the often dire condition of patients, and the opportunity to participate in treatment with parenteral drugs, to work with specialists in medicine, and to engage in experimental activity and interaction with many health care professionals.

Most clinically trained pharmacy graduates seek positions in hospitals or teaching institutions; few enter urban community practice, and even fewer enter rural community practice. However, the majority of real or imagined health problems are among ambulatory patients. Since these are the people who visit outpatient clinics and purchase prescribed and over-the-counter medications, clinically trained pharmacists might make their greatest contributions to patient care in community practice.

Demonstration Project

A demonstration project was carried out to test the hypothesis that clinically trained pharmacists could have an impact on patient care in non-urban communities. Two significant questions were addressed: Can a program be implemented that will better use the skills of these pharmacists, and will these services be accepted by the public? Will the increase in skills and services contribute to improved health care?

The following four sites in Minnesota were selected for the project:

Town 1, with no physician services but with a functioning pharmacy.

Town 2, with partial physician services (1 or more days week) and a functioning pharmacy.

Town 3, with a functioning pharmacy and physicians but no hospital.

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Town 4, with physicians, pharmacies, and hospital services.

These sites were considered representative of pharmacy practice settings in rural Minnesota. Twelve clinical pharmacy residents from the University of Minnesota were employed in the project. The objectives were as follows:

- To determine the health care needs of the designated communities, to inventory health care services by use of guides and directories available from the State health department and other health care agencies, and to determine role models, congruent with these objectives, for the clinically trained pharmacists.
- To implement appropriate use of role models in the designated communities.
- To measure the resulting quality of care; this was accomplished primarily through diaries and encounter forms maintained by the clinical pharmacists.
- To measure the resulting monetary cost of that health care delivery.
- To determine the role of communication (for example, by telephone) in conjunction with pharmaceutical services in improving the delivery of care.
- To develop an evaluation instrument for the year of operation.
- To provide public and patient health education; when feasible, this was accomplished in cooperation with public health education specialists.
- To provide a guided, professional exposure to health care and continuing education; where feasible, this was accomplished through cooperation with local agencies, professional associations, and the College of Pharmacy.
- To provide ambulatory clinic experience for clinical pharmacists.

The clinical pharmacy residents were rotated through the four sites for almost 1 year; their average time at a site was 4–8 weeks. The clinical pharmacy residents were allowed to pursue their interests in the rural sites and hence define their roles. The project staff, from a modest budget, provided support for the residents in the form of textbooks, research reports, and health education leaflets.

The clinical pharmacy residents participated with community pharmacists, public health nurses, physicians, dentists, and other health care personnel in carrying out the following activities:

All four towns. Routine immunizations, compliance checks, structured referral system, physician consultation, maintenance drug monitoring (for town 1, these five activities required telephone consultation with a physician), venereal disease information, drug use profiles, drug information, dispensing of prescription drugs, patient education, over-the-counter consultation, poison control information, dial-a-ride, blood pressure screening, economic aid information, family planning information, medical self-help classes, drug abuse information, and public health education.

Town 1 only. Throat cultures and other laboratory tests.

Town 2 only. Coordination of part-time physician services.

Towns 1 and 2 only. Emergency services and referrals.

Towns 2, 3, and 4 only. Laboratory tests and collection of samples for testing.

Results

Evaluation of the project involved three components: subjective assessment by participants, records maintained by the clinical pharmacy residents, and a community survey of health beliefs and attitudes.

Project participants, overall, responded favorably to utilization of clinical pharmacy residents in rural practice settings. Table 1 shows specific positive and negative aspects of the project.

The records maintained by the clinical pharmacy residents and assessment by other participants indicated that the residents performed the following:

- Inpatient (hospital and nursing home) counseling regarding drug use.
- Outpatient counseling regarding drug use.
- Education of practicing pharmacists in clinical aspects of practice.
- Education of other health care practitioners in appropriate drug therapy.
- Improvement of drug delivery system.
- Implementation of inpatient drug utilization review (DUR).
- Implementation of outpatient (local pharmacy) DUR.
- Counseling of non-ambulatory patients in the home.
- Facilitation of communication among health professionals.
- Implementation of community health education services (local pharmacy, mass media, high school, and senior citizen groups).
- Establishment of a local drug information and poison control center.
- Implementation of preventive health efforts such as hypertension screening programs.
- Implementation of maintenance monitoring programs for epileptics, hypertensives, and asthmatics.
- Improved recording systems in drug distribution.
- Coordination of health care services.

• Detection of drug side effects and subsequent modification of drug therapy.
• Improved distribution system for controlled substances.
• Diabetes screening program and inservice staff lectures.

Specific encounters and accomplishments may be somewhat anecdotal, but they are helpful in defining the roles that the clinical pharmacy residents assumed. Some specific accomplishments were:

• Discontinuation of contraindicated over-the-counter or folk medications for many patients.
• Substitution of ANCEF for Keflin in intramuscular dosing.
• Use of aminophyllin over Choledyl for some asthmatics.
• Use of aminophyllin granules to restore gastrointestinal flora in a patient receiving long-term antibiotic therapy for chronic diarrhea.
• Detection of subtherapeutic aminophyllin prescribed for an asthmatic child and correction to therapeutic dose.
• Adjustment of drug therapy for patients receiving medications for chronic illnesses (for example, for asthmatics receiving aminophyllin).
• Decreased use of major tranquilizers for nursing home patients.

Table 1. Results of evaluation of the project by participants

Positive aspects	*Negative aspects*
Clinical pharmacy residents	
Increased their professionalism	Underuse of clinicians' skills and knowledge
Opportunity to work with physicians and help with therapy	Limited opportunity for multiple interdisciplinary interaction
Contact with rural physicians and aid with drug therapy	Professional isolation
Good response from community to blood pressure monitoring and consultation	Travel time required
Counseling patients and patient contact	Skepticism regarding actual practicality and self-supporting potential
Information resource for physicians	Lack of enthusiasm of local practitioners
Source of continuing education	Idle hours in the pharmacy
Increased pharmacy involvement in communication and patient surveillance	Discontinuous physician services and difficulty in establishing rapport
Improving drug distribution systems	Lack of community enthusiasm
	Little professional stimulation
	Physician skepticism
Physicians	
Medication profiles	Poor groundwork in implementing clinical services
Drug information resource	Lack of continuity in clinical pharmacy residents' services
Hypertension and diabetes detection programs	Questionable tact of clinical pharmacy residents with some patients
Nursing home and hospital drug distribution systems	
Nurses	
Valuable inservice lectures	None
Information resource on drug therapy	
Improved drug distribution systems	
Community pharmacists	
Blood pressure screening and monitoring programs	Discontinuity
Drug talks	Lack of interest by clinical pharmacy residents
Drug information resource	Short duration of project
Patient counseling and information	
Informal education process achieved through interpersonal interaction	
Improved nursing home and hospital drug distribution systems	
Others [1]	
Interaction with clinical pharmacy residents	Insufficient groundwork by clinical pharmacy residents in implementing clinical services
Inservice lectures and discussions	
Improved drug distribution systems	
Information resource	

[1] Public school personnel, nursing home administrator, physician's assistant, hospital administrators, and county health nurses.

- Prevention of intended use of cromolyn sodium for acute asthmatic attacks in a child.
- Consultation with diabetics on the proper use of U-100 insulin and combination injection of regular and Lente insulin for a young diabetic girl.
- Referral of a young man to an ear, nose, and throat specialist for observation after his broken nose, set by the local physician, became severely infected.
- Use of crude coal tar and ultraviolet light on a patient with psoriasis; this patient's condition improved subsequently.
- Referral of a patient with chronic urinary tract infection complicated by urinary retention to a neighboring clinic for catheterization.
- Advising an obese hypertensive on the importance of maintaining a low salt diet with the proper use of Enduron.
- Advising patients against using Valium and Demerol together.
- Adjustment of phenobarbital dosage for an epileptic patient.
- Referral of an anxious, potentially psychotic patient to a hospital for observation and treatment.
- Adjustment of Mysoline dosage for one epileptic patient and Dilantin dosage for another epileptic patient, to achieve better control.
- Increased control of gout in a patient by counseling him on the proper use of cholchicine.
- Detection of potential drug interaction of significance in a patient receiving propranolol.
- Therapy change from probenecid to allopurinol with decreased dosages of probenecid for a gout patient.
- Correction of Crystodigin toxicity and impending Coumadin overdosage for a discharged hospital patient (home visit).

Community attitudes were assessed from responses to a mail questionnaire. Attitudes concerning the accessibility of, and satisfaction with, local health care services were sought because the important factors in seeking medical care in response to symptoms are (*a*) the patient's objective clinical disorder and symptoms as well as his or her perception, knowledge, beliefs, and attitudes about having a particular disorder or symptom, (*b*) the patient's attitudes toward and expectation of the physician and medical services, and (*c*) the patient's definitions of health, sickness, and when medical care is necessary (*1*).

The questionnaire was sent to 100 local residents, randomly selected, in each of the 4 sites. Chi-square analysis of the information obtained, with an average response rate of 38 percent, revealed no significant differences in attitudes among the respondents before and after their exposure to the clinical pharmacy residents. Thus, the responses did not support the hypothesis that the project would change attitudes toward health care. However, the response frequencies indicate that the persons who were exposed to the clinical pharmacy residents consistently reported greater willingness to accept the performance of certain activities by a clinical pharmacy resident (table 2).

When persons need health care, the provider they seek first is one in whom they have confidence and who is accessible to them. Thus, the community residents were also asked who they would seek first for 18 needs, ranging from the common cold to acute chest pain to family planning. Again, no significant difference in responses was seen between pre-exposure and post-exposure to the clinical pharmacy residents. The clinical pharmacy residents were named as the secondary source of information for care of sunburn, arthritis, a cold, upset stomach, minor headache, persistent cough, hemorrhoids, and diarrhea. However, the responses did indicate that some persons would seek care from providers other than physicians.

Summary and Conclusions

Many questions regarding clinical pharmacy practice in the rural environment remain unanswered. However, this project resulted in a number of important findings. Of paramount importance is the conclusion that clinical pharmacy residents found need and experienced considerable demand for their services. Much of their time was consumed in provision of in-service presentations regarding drug therapy and clinical management of patients to nurses, physicians, and other health care professionals. Drug therapy and patient-management seminars were also provided to community pharmacy practitioners and other non-institutional health care professionals such as public health nurses. Community education regarding clinical pharmacy services and public and personal health was accomplished via the media (newspaper and radio), personal contact with patients in institutional and ambulatory care settings, and presentations before community and civic groups. The demand for clinical pharmacy residents as sources of information regarding licit and illicit drug use was great, emphasizing a need to train clinical pharmacists in techniques of presentation of controversial drug abuse information to student and community groups.

Clinical pharmacy residents were accepted by local health care practitioners, cooperating with physicians, nurses, pharmacists, and others in improving patient

Table 2. Response frequencies (in rounded percentages) for questions asked community residents, before and after their exposure to clinical pharmacy residents, concerning willingness to have clinical pharmacy residents perform certain activities

Activity	Pre-exposure			Post-exposure		
	Unwilling	Undecided	Willing	Unwilling	Undecided	Willing
Ask questions about your problem before physician sees you	45	17	38	35	11	54
Take blood pressure and pulse before physician sees you	22	16	53	39	5	56
Take throat cultures	44	21	34	42	10	48
Perform simple emergency tasks, such as suturing cuts	54	16	31	57	13	31
Give immunizations	47	13	40	41	6	54
Help you to decide whether to see a physician	36	17	47	32	14	54
Tell you where to go or who to see when no physician is available	17	12	72	7	8	86
Monitor your chronic condition between regular visits to your physician	20	16	64	21	10	70
Give you information and directions about your medicine	12	5	82	7	5	89
Advise you what to do if family member is poisoned	7	5	89	7	3	91
Give you information about proper use of over-the-counter drugs	7	5	89	4	0	97
Fill your prescriptions	7	0	94	1	0	99

care. An important outcome was apparent increases in communication among disciplines. It was the consensus of the project staff that the element of an "outside" resource person served as a catalyst for improved communication and cooperation among local practitioners.

Other contributions to community welfare and patient care included hypertension and diabetes screening programs, improved drug delivery systems in institutions and community practice, maintenance monitoring of chronic medication therapies for asthmatics, hypertensives, epileptics, and others, as well as home visits to discharged hospital and ambulatory patients.

A fundamental concern throughout the project was the short duration of this demonstration study and the need to terminate services in each site at the project's end. Consequently, much emphasis was placed on training existing community pharmacists in clinical pharmacy practices and preparing them to maintain initiated services after the clinical pharmacy residents left the community. Findings at the termination of the project indicated greater involvement by community pharmacists and maintenance of many services initiated by the clinical pharmacy residents.

It is equally important to learn from the mistakes and liabilities of the project. A particular problem was the reluctance of many clinical pharmacy residents to practice in rural areas. This reluctance contributed to discontinuity in services because the residents had been rotated through the community sites. It is our conclusion that recruitment of clinical pharmacy residents with rural practice preferences would be far more fruitful than attempts to persuade residents to accept rural practice. In this regard, clinical pharmacy may face many of the same problems faced by medicine in the proper distribution of practitioners to rural environments.

Finally, it appears that pharmacists with clinical and specialized training might be used most efficiently in rural areas in roles devoted to training other health care professionals in advanced drug therapy and patient management. Similarly, it seems advisable to have clinically trained pharmacy residents function as consultants to rural pharmacists, rather than working in community pharmacies. Clinical residents can help rural pharmacists improve communication and cooperation with other local health care practitioners, as well as train rural pharmacists in clinical aspects of medicine.

Although the self-supporting potential of clinical residents in the rural environment was not directly established in this project, subsequent investigation revealed that a clinical pharmacist is now a consultant in one of the former project sites.

Reference

1. Stoeckel, J., et al.: On going to see the doctor, the contribution of the patient to the decision to seek medical aid. J Chronic Dis 6: 989 (1963).