Improving Medical Education in Therapeutics

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Modern medical education has not dealt as effectively as it should with education of physicians in therapeutics. A traditional emphasis on the critical importance of correct diagnosis has not been followed by appropriate concern with the problems of therapeutics. Given the facts outlined below, this deficiency needs correction.

In the four decades since World War II, the United States has had a revolution in drug therapy. Even with the removal of more than 5000 products from the market as the result of the Food and Drug Administration's Drug Efficacy Study Implementation program, which was conceived in 1968, well over 8000 prescription drugs or combinations of drugs are now available in the United States. Old and familiar classes of drugs have expanded in size dramatically in this time. There are now at least 22 different penicillins available in the United States. The nonsteroidal anti-inflammatory drugs, (formerly the salicylates, phenylbutazone, and oxyphenbutazone) have been followed and largely supplanted by 11 new members of the class and a variety of new forms of salicylate salts. New classes of drugs such as the beta blockers and the cephalosporins, which were introduced by a single drug less than 15 years ago, now have become large families of agents. Seven different beta blockers are now available to physicians and their patients, and 15 different cephalosporins are now marketed in the United States. Development of new drugs is continuing and new classes of drugs such as the calcium channel blockers, angiotensin converting enzyme inhibitors, carbapenim antibiotics, and antiviral agents such as acyclovir continue to be introduced. In the United States today, a new chemical entity is approved for human use on the average of once every 2 to 3 weeks.

The number of prescriptions written in the United States has increased dramatically. Reliable estimates place this number in 1981 at approximately 1.3 to 1.4 billion, or 6.2 prescriptions for every person in the nation. In addition to absolute increases in the number of prescriptions written, the size of individual prescriptions has also increased. Between 1971 and 1981, the average size of a prescription increased by approximately 27% and the total amount of prescription drugs dispensed in the United States increased by 35% (1).

In the United States, approximately two thirds of all physician visits lead to a drug being prescribed (2). It has been estimated that a patient seeing a physician in the United States for a specific complaint receives approximately four times more medication than a person with the same complaint in Scotland (3). Whether this is reflected in improved health care remains to be established. In one study (4), 60% of physicians prescribed antibiotic treatment for the common cold. Studies (5-7) of antibiotic usage in hospitalized patients suggest that perhaps as many as 64% of antibiotic prescriptions in hospitals are either unnecessary or are for an inappropriate dose.

As drug use increases, adverse reactions to drugs can be expected to increase correspondingly. It has been estimated (8-10) that between 10% and 15% of all hospitalized patients have an adverse reaction to a drug during a hospital stay. While many adverse drug reactions are relatively minor and predictable occurrences, estimates of the frequency with which adverse drug reactions are the cause of hospital admissions have ranged from 0.5% to as high as 7.9% (8-13). In one study of 2499 hospital admissions, 4.1% were found to be due to adverse drug reactions. It was estimated that 27% of these admissions could have been prevented with more prudent drug therapy (12).

Unnecessary medical costs due to inappropriate drug use have not been calculated. However, given the evidence cited above, including the cost of excessive drug use, the recognized number of adverse reactions to drugs and the costs of hospitalization for treatment, and supplemental costs necessitated by such problems as acquired bacterial resistance to newly developed antibiotics, it is reasonable to conclude that the cost to our society is substantial.

The American College of Physicians recognizes that the "drug revolution" provides physicians with the opportunity to treat patients more safely, rapidly, and effectively than ever. To take full advantage of the potential benefits new developments in drug therapy offer to patients, and simultaneously to control the potential dangers these developments offer, the American College of Physicians recognizes the need for improved education of physicians and other health care professionals in rational therapeutics.

Positions

1. The American College of Physicians supports increased education in therapeutics in medical school curricula and in-house officer training.

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Virtually all formal pharmacologic education presently occurs in the second year of medical school, before significant exposure to clinical medicine. In this context, students are taught about drugs that are used to treat diseases with which they have only passing acquaintance, and have never actually seen in clinical situations. This often amounts to giving students solutions to problems they have yet to recognize exist.

While this early training in pharmacology is essential to medical education, subsequent education in clinical medicine needs to pay greater attention to inculcating in future physicians the basic principles and important facts necessary for rational therapeutics. This goal may be achieved by developing formal courses in clinical pharmacology and therapeutics in the last 2 years of the medical curriculum, or by incorporating more formal discussions of basic therapeutics into existing clinical programs. Students need to be taught in the clinical context about the rational use of drugs. This instruction should provide a familiarity with the clinical relevance of important pharmacokinetic concepts, an understanding of the need for individualization of drug dosage, an awareness of particular patient populations where drug therapy may be especially difficult, an understanding of the decisive importance of clinical trials for evaluating new therapeutic techniques, and a wise skepticism of pharmaceutical industry claims.

House officers are just as equally in need of educational programs in therapeutics. Frequently they are poorly informed about basic laws governing prescription and distribution of medications, and about basic elements of adequate prescription writing. The substantial majority of all drug orders in hospitals are written by these physicians. Reviews of hospital drug use show that hospitalized patients generally are treated with the most recent and novel drugs available. Of the 25 major drugs most frequently prescribed for hospitalized patients in 1983, only 5 had been available for more than 10 years (14). As has been noted, there is evidence that some of this usage is inappropriate. Like medical students, house officers need to continue to learn basic pharmacologic principles, further develop their ability to evaluate clinical trials, and gain a better understanding of the role of drugs in our society and in the physician-patient relationship.

2. The American College of Physicians supports improved continuing medical education in therapeutics for practicing physicians, encourages the utilization of new techniques for providing physicians with timely information on drug efficacy and toxicity, and supports further research into optimal techniques for providing physicians with continuing education in pharmacology.

The continued development of new pharmacologic agents mandates an emphasis on continuing pharmacologic education for the duration of a physician's professional career. By the time a physician completes a 3-year residency program, it is usually 5 years since his course in pharmacology. In that interval, approximately 100 new drugs will have become available for his patients. Approximately 85% of all prescriptions written by senior physicians who graduated from medical school in 1960 will be for a drug about which they have received no formal education. Not surprisingly, reviews of prescribing practices of physicians suggest that the time at which they completed their specialty or subspecialty training is a critical factor in predicting their subsequent selection of therapeutic options (15).

After the completion of formal medical school and house officer training, there is no systematic exposure to intelligent, informative, and unbiased assessments of drug therapy. Continuing education in pharmacology occurs as the result of random encounters with a variety of information sources, including medical journals, the lay press, interactions with colleagues, and pharmaceutical industry sales representatives. The entire process can be characterized as largely random, incomplete, and subject to distortion.

Therefore, physicians should be provided with up-to-date and clinically relevant information concerning new experience with old drugs, the probable safety and efficacy of new drugs, and new advances in therapy. This information may be provided by means of informational bulletins, postgraduate medical education courses, grand rounds, or other activities. Increased dissemination of information concerning the activities of the Food and Drug Administration would also be particularly useful.

The College supports increased communication with pharmacists, as health care professionals with particular knowledge in this area. The use of hospital drug information centers staffed by pharmacists, and the use of computerized pharmacy programs concerning adverse drug reactions and potential drug interactions should also be expanded.

While recommending increased dissemination of information through these channels, the College recognizes that there is evidence to suggest that physicians respond poorly to written factual material distributed to them through normal channels. It appears that focused educational programs for individual physicians or small groups of physicians, programs that deal with specific issues in drug therapy, are more consistently successful (16-18).

In one study (16), direct discussion between a physician and a trained “detail” representative equipped with appropriate graphic and written material was the most effective way of affecting physicians' prescribing habits. Recent work (19) has described the effectiveness of a course in “clinical pharmacology” in improving the pharmacologic knowledge of graduating medical students. How such a course affects these physicians' actual use of drugs in their practice of medicine has not been described. How such a course might be adapted to the education of practicing physicians instead of medical students also has not been investigated. Further research is needed to clarify which techniques are best suited to the efficient distribution of information to physicians in a way that enhances their prescribing habits.

3. The American College of Physicians supports new approaches to improving the understanding of drugs by
patients and improved communication about medications between health care professionals and patients.

All patients are entitled to a full and thorough discussion of the benefits and potential risks of any medication prescribed for them. In addition, the face-to-face discussion with their physician may be usefully supplemented with other techniques for patient education. In some circumstances, this could involve discussion of the medication not only with the physician, but also with a nurse or clinical pharmacist with special training in this area. Many patients will benefit by the distribution of written material as a supplement to the information provided at the time of the office visit. Therefore, the College encourages its members to use the variety of informational material for patients developed by organizations such as The American Association of Retired Persons and the American Medical Association, as well as other organizations.

Patients should be asked to read this literature at their leisure, and to ask their physicians any questions that are raised. Patients should also be encouraged at each encounter with a physician to discuss their medication and any adverse effects it may be producing.

American physicians prescribe more medication than their counterparts in other nations. While American physicians prescribe four times more medication than Scottish physicians, for example, few would defend the notion that Americans are four, three, or even two times healthier than their Scottish peers. Ironically, although physicians in this country prescribe a great deal, they also tend to express little optimism about the benefits of the medications they have given (4). In addition, some prescriptions serve purposes other than strictly medical ones. The prescription may be used by the physician as a signal to the patient that the visit has come to an end. It may also serve as evidence to both parties that the visit has been productive, and that the physician is "doing something" for the patient.

An essential aspect of improved drug therapy is a better understanding of how societal expectations of physicians and societal attitudes toward drugs influence the practice of medicine in the United States. Further research into this problem is needed.

4. The American College of Physicians supports a systematic reevaluation of the relationship between the pharmaceutical industry, the practicing physician, and continuing pharmacologic education

While physicians uniformly deny that their understanding of drugs is influenced by the activities of the pharmaceutical industry (20-23), there is considerable evidence to support the efficacy of the personal encounter with a professional salesperson in shaping physicians' attitudes towards drugs. Avorn and associates (23) examined the opinions of practicing physicians in regard to three areas of drug prescribing, and found that the actual prescribing practices of physicians appeared to be heavily influenced by the views of the pharmaceutical industry.

The pharmaceutical industry may well be the primary source of continuing pharmacologic education for many American physicians. In this context, it is the responsibility of the pharmaceutical industry to support high-level educational programs for physicians that are separate and apart from their own marketing efforts.

Further research into the relationship of the pharmaceutical industry to patterns of drug utilization in the United States and to physician prescribing habits is needed. There is a need for formal guidelines of conduct for the College and its member physicians in their interaction with the pharmaceutical industry. Such a code of conduct has recently been adopted by The Royal College of Physicians (24). It provides detailed recommendations for the relationship of the profession to the industry and could serve as a model for guidelines for physicians in the United States.

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References