Innovations in Family Medicine Education

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Editor's Note: Send submissions to jfreeman3@kumc.edu. Articles should be between 500–1,000 words and clearly and concisely present the goal of the program, the design of the intervention and evaluation plan, the description of the program as implemented, results of evaluation, and conclusion. Each submission should be accompanied by a 100-word abstract. Please limit tables or figures to one each. You can also contact me at Department of Family Medicine, KUMC, Room 1130A Delp, Mail Code 4010, 3901 Rainbow Boulevard, Kansas City, KS 66160. 913-588-1944. Fax: 913-588-2496.

Practical Therapeutics: An Innovative Residency Drug Education Curriculum

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Objectives: We developed and implemented a drug education curriculum for family medicine residents. Methods: Bimonthly 45-minute sessions include annual coverage of commonly prescribed drug classes and other medications of interest. Faculty and residents prepare session materials, including an evidence-based summary handout, patient case examples, and a short test in advance. Results: Statistical analysis comparing pre- and post-session test scores demonstrated highly significant improvement in participant knowledge. Participant feedback revealed 100% satisfaction with the program. Conclusions: This drug education curriculum is well liked and effective. Such pharmacotherapy education may reduce adverse drug events and improve patient health.

National attention is currently focused on adverse drug events (ADEs), following the publication of several prominent reports about their consequent morbidity, mortality, and costs totaling billions of dollars annually.1-5 ADEs complicate an estimated 2%-7% of hospital admissions, and outpatient prescription errors are also frequent.6

ADEs are commonly related to drug knowledge,7,8 and the lack of formal medical school and residency clinical pharmacology training may be to blame.9 In a study of five family medicine residencies, a drug knowledge assessment survey was given to 80 residents.10 While scores were higher for more-experienced residents, they were low overall. The residents themselves identified the need for a formal pharmacotherapy curriculum. Incorporating new material into already packed medical school curricula seems unlikely,11 although the majority of internal medicine residency directors in a recent survey responded favorably to the concept of adding drug education material into their training programs.12

Three publications in MEDLINE since 1980 describe drug education programs, two inpatient and one outpatient.13-14 The single outpatient curriculum is taught by pharmacists and is monitored via prescription monitoring and drug utilization evaluations.14 Our innovative outpatient drug education curriculum can be easily adapted for use in residencies without the benefit of these resources.

Methods Curriculum Design

The authors, two family medicine faculty members in an urban, university-based residency program, developed this drug education curriculum. Regularly prescribed drug classes are designated “Annual Core Topics,” and other medications of interest, typically newly approved drugs, are covered periodically.

In designing the curriculum, we used published American Society for Clinical Pharmacology and Therapeutics (ASCPT) guidelines describing core pharmacology concepts for primary care residencies.15 These include drug mechanism of
action, therapeutic uses (FDA approved and non-approved), adverse effects, and potential drug interactions. We also emphasize using evidence-based literature regarding therapeutic drug use. We designed this drug education curriculum for residents, but attending physicians and medical students also participate regularly.

Curriculum Format/Implementation

Bimonthly 45-minute sessions are conducted within the residency morning conference schedule. Faculty, or residents in consultation with faculty, prepare lecture materials. They also prepare evidence-based educational materials using pharmacology textbooks, along with relevant clinical trials and review articles identified from MEDLINE searches. The advantages and disadvantages of newer agents compared to older, similar medications currently in use are highlighted. Information is summarized in a one- or two-page handout. Presenters also prepare patient case examples, along with a five- to six-question quiz that reinforces key learning points.

Each drug education session begins and ends with the quiz. The pretest (5 minutes) is followed by a 15–20 minute lecture by the presenter, who uses the prepared summary handout. Attendees retain these handouts for future reference, and a binder with all of the handouts is maintained in the residents’ library. The group discusses the prepared patient cases along with cases brought up by audience participants (10 minutes). The posttest is given and collected (5 minutes); correct test answers are reviewed afterward (5 minutes). Finally, session evaluation forms are distributed.

Curriculum Evaluation

A brief written audience survey provides ongoing feedback. Attendees are also asked to suggest topics for future sessions. These surveys have revealed 100% satisfaction with the educational program.

To determine the effect of the education program on physician knowledge, we compared the change in pretest (baseline) and posttest scores from a convenience sample of seven lectures, each presented and attended by different participants. Statistical analysis was performed using paired one-tailed Student t tests with Microsoft Excel (version XP) software.

Results

Statistical analysis demonstrated highly significant improvement in participant knowledge (Table 1). Posttest scores were significantly higher than the corresponding pre-

<table>
<thead>
<tr>
<th>Drug Education Topic</th>
<th>Pretest Raw Score (Mean ± SD); Expressed as % Correct</th>
<th>Posttest Raw Score (Mean ± SD); Expressed as % Correct</th>
<th>P Value for One-tailed t Test Comparison of Pretest and Posttest Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clopidogrel (Plavix)</td>
<td>4.1 ± 1.2; 68.9 ± 21%</td>
<td>5.3 ± 0.8; 88.9 ± 14%</td>
<td>.00021**</td>
</tr>
<tr>
<td>Imiquimod (Aldara)</td>
<td>4.1 ± 0.76; 82.2 ± 15%</td>
<td>4.7 ± 0.49; 93.3 ± 10%</td>
<td>.0019*</td>
</tr>
<tr>
<td>Diabetes medications</td>
<td>3.1 ± 1.2; 51.2 ± 20%</td>
<td>4.9 ± 0.9; 81.0 ± 14%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Osteoporosis medications</td>
<td>3.3 ± 0.8; 54.2 ± 13%</td>
<td>5.3 ± 0.7; 88.9 ± 11%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Zaleplon (Sonata)/sleep medications</td>
<td>1.9 ± 1.0; 37.5 ± 19%</td>
<td>4.3 ± 0.6; 85.0 ± 12%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Weight loss medications</td>
<td>2.1 ± 1.6; 42.5 ± 33%</td>
<td>4.8 ± 0.5; 95.0 ± 9.0%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Antihyperlipidemic medications</td>
<td>2.8 ± 0.8; 47.2 ± 13%</td>
<td>5.0 ± 0.9; 83.3 ± 15%</td>
<td>.00044**</td>
</tr>
</tbody>
</table>

SD—standard deviation
E—exponent

* P < .01
** P < .001

Tests have five to six questions each.
test scores for all seven sampled tests ($P < .01$ or $< .001$). Pretest scores (mean ± standard deviation [SD]) ranged from 37.5 ± 19% to 82.2 ± 15% correct at baseline. Posttest scores ranged from 81.0 ± 14% to 95.0 ± 9.0% correct following the drug lecture.

Conclusions

Recent national attention has been devoted to the financial and health burdens imposed by ADEs, which are partially attributable to deficiencies in physicians’ pharmacology expertise. Our drug education curriculum is designed to systematically build and maintain physicians’ pharmacology knowledge base. Statistical analysis of sampled test scores demonstrated highly significant increases in short-term knowledge.

A potential limitation of the curriculum is the unavailability of standardized lecture materials. However, national continuing medical education (CME) materials are prepared by diverse faculty, without standardization. Experienced faculty educators carefully prepare our program materials. Preparing the materials provides an additional learning experience for residents as well.

Our program evaluation demonstrates only improved short-term knowledge, not long-term retention. Our posttests are given immediately to reinforce key learning points from each session. We plan to incorporate future analyses with the posttests given at later dates to assess long-term knowledge retention. To encourage knowledge retention, our curriculum core topics are repeated annually. Participants give us frequent feedback that they continue to use the prepared drug information handouts regularly in patient care.

Our proposal to incorporate this educational program into medical training may be considered burdensome, given reduced faculty time and financial support in many family medicine residencies. However, in the previously cited survey of internal medicine residency directors, the majority were favorable toward adding residency drug education material. Involving clinical pharmacists in medical decision making is an alternative, effective method for reducing ADEs, with documented improvement in health care outcomes. However, fewer than 25% of family medicine residencies have clinical pharmacists on staff. The pharmacology curriculum described here included the guidance of a pharmacist but can be successfully implemented in programs lacking such assistance. Our drug education curriculum provides educational benefits to participants both preparing and attending lectures. The curriculum is practical, enjoyable, and effective. Pharmacotherapy education may reduce ADEs and improve patient health.

Samples of all curriculum materials described (lecture topic list, handouts, pretests and posttests, audience feedback survey) are available from the corresponding author on request by e-mail or regular mail.

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References