INTRODUCTION

The challenge for pharmacy educators is to instill in their students not only a strong clinical base and excellent communication skills, but also a high level of motivation and commitment to pharmaceutical care(1-3). Although several professional pharmacy organizations support the concept of pharmaceutical care, there are several barriers to its application(4-6), including deficient clinical knowledge and communication skills and insufficient time. Negative attitudes of pharmacy practitioners toward pharmaceutical care have been identified as a significant barrier interfering with its practice(7-10).

The opportunity for students to interact with patients and develop practical concepts about the importance of performing pharmaceutical care occurs traditionally in the latter stages of the pharmacy curriculum, during the experiential component. Introducing students to patients early in the pharmacy curriculum provides a demonstration of the importance of performing care. Additionally, these early experiences may help students develop positive attitudes regarding pharmaceutical care activities. Such attitudes will hopefully motivate students to incorporate these concepts into practice.

The Clinical Applications II (CAII) course, a required course at the University of Georgia College of Pharmacy, was designed to teach first-year pharmacy students about disease states and patient care by bringing actual patients into the classroom to present to the students. In addition to learning basic information about disease states, the course was designed to facilitate student-patient interaction and to foster students’ attitudes toward pharmaceutical care. Although the participation of actual patients in the classroom to foster the development of positive pharmaceutical care attitudes has not been described in the literature, the designers of the CAII course believed that exposing students to patients early in the pharmacy curriculum would have a favorable impact. Such a course would allow students to begin developing student-patient interaction skills, learning and understanding the important role that pharmacists can play in patient care, and instilling a sense of responsibility for patients’ medication outcomes(11). Furthermore, with the increasing demands on clinical preceptors to take more and more students on clerkships and yet maintain quality clinical experiences, the coordinator of the CAII course believed that the course would serve as a “bridge” between didactic and experiential training to prepare pharmacy students to start thinking like a pharmaceutical care practitioner early in their didactic education. The purpose of this study was to evaluate the affects of the CAII course on students’ pharmaceutical care attitudes.

DESCRIPTION OF THE CLINICAL APPLICATIONS II COURSE

The University of Georgia College of Pharmacy implemented a new curriculum in Fall 1995. The CAII course is one of several required courses in the revised first-year pharmacy curriculum at the College of Pharmacy. This course provides one semester-hour credit and meets twice weekly for the last three weeks of each Spring semester. The CAII course involves patients coming to class and discussing their illness and how...
their illness affects their lives. By using actual patients in this course, the designers and instructors envisioned that student-patient interaction would not only facilitate knowledge of disease states, but should also help facilitate the development of positive pharmaceutical care attitudes.

The patients involved in the CAII course presented to the class on the following diseases: diabetes mellitus, acquired immunodeficiency syndrome (AIDS), angina pectoris, asthma, and hyperthyroidism. At the beginning of each CAII class period, approximately 30 minutes are devoted to a lecture by the CAII course coordinator which reviews the disease state to be presented that day. Immediately following the disease state review, 45 to 60 minutes are devoted to a discussion (presentation) by an actual patient with one of the aforementioned diseases. All patients were advised of the class format, expectations of the students, and length and depth of the presentation by the course coordinator prior to the class. Within this 45 to 60 minute period, the patient discussed many aspects of the disease including disease onset, diagnoses, medications (including medication compliance and adverse medication experiences), the impact the disease had on their quality of life, the importance of pharmacotherapy in managing the disease, and the role the pharmacist played in helping to manage the disease. After this patient presentation, students were allowed to ask the patient questions. The question and answer period usually lasted 60 minutes. With the exception of one patient who died in January 1997, the same patients have participated in the course since Spring 1996. Details describing the CAII course have been published earlier in the Journal (12).

METHODS

The Pharmaceutical Care Attitude Survey

A valid instrument that measures students’ pharmaceutical care attitudes was needed to measure the impact that the CAII course had on students’ pharmaceutical care attitudes. After the first offering of the CAII course in Spring 1996 the Pharmaceutical Care Attitude Survey (PCAS) was developed (13). To provide additional support for the instrument’s validity, it was cross-validated in 1998 (14). The results of these studies provided evidence that the PCAS is a valid and reliable instrument (13, 14). The PCAS consists of 13 items with three separate constructs (“professional benefit,” “professional duty,” and “return on effort”; see Appendix)(13, 14). Eleven of the 13 items on the PCAS are positively worded and two are negatively worded. In order to calculate the total scale score, the two negatively worded items (labeled “Time” and “Add Work”) were designed to be reversed scored so that higher scores represent more positive attitudes toward pharmaceutical care. The ranges for score components on the three scales are 8 to 40 for the “professional benefit” scale (construct), 3 to 15 for “professional duty” scale, and 2 to 10 for the “return on effort” scale. Based on the favorable results of the cross-validation study of the PCAS, this instrument was used to measure students’ pharmaceutical care attitudes in this study (14).

Of the 13 items on the PCAS, one item (labeled “Clerk”) was designed to assess attitudes concerning the provision of pharmaceutical care services while students are on clerkship as part of their pharmacy education. Since this item may not be relevant to all pharmacy students, in particular those students who are not familiar with clerkship experiences, previous research with the PCAS suggested the use of a reduced 12-item (PCAS-reduced) instrument without the clerkship item (13, 14). Since there are two forms of the instrument (PCAS-reduced and the full-PCAS), the full 13-item PCAS was used in this study to examine the effects of the CAII course on all the items of the PCAS including the “clerk” item.

Survey Administration

On the first day of the CAII course, first-year pharmacy students were taught that pharmaceutical care is the responsible provision of medication therapy for achieving definite outcomes that improve a patient’s quality of life and involves pharmacists working with patients and other health care professionals in designing, implementing, and monitoring a therapeutic plan for achieving definite outcomes (15-17). After teaching basic pharmaceutical care principles, and before the first patient’s presentation, all first-year students enrolled in the CAII course were given the PCAS (pre-PCAS) in April 1998. Students were asked to respond to each of the 13 items of the PCAS by using a five-point Likert scale ranging from 1= “strongly disagree” to 5 = “strongly agree”. Additionally, students were asked to include their telephone numbers and last initial on the PCAS as a unique identifier. Immediately after the question and answering session on the last day of the CAII course, students were again given the PCAS (post-PCAS) to complete. Students were requested to provide the same information following completion of the post-PCAS as on the pre-PCAS. The post-survey was marked to prevent the investigators from mixing the item scores of the pre and post-surveys. Student participation in the study was voluntary and the identity of the students was blinded to the investigators.

Statistics

All pre- and post-PCAS data were entered in Microsoft Excel(c) and then downloaded into SPSS(c) for analyses. Pre and post-means and standard deviations for each of the 13 items and the three scales of the PCAS were calculated. Since the validity of one global score on the PCAS has not been established, the score for each of the three scales were calculated. Pairwise t-tests were used to detect if there were any differences between students’ pre and post-scores for each of the 13 items of the survey and for its three scales. To reduce the probability of committing a type I error, the Bonferroni procedure was used and the significance level was decreased to 0.3 percent rather than five percent. The reliability of the PCAS was assessed by calculating the Cronbach’s alpha for each of the three scales.

RESULTS

A total of 95 students (99 percent response rate) completed the pre-PCAS and 96 students (100 percent response rate) completed the post-PCAS. All 95 students who returned both the pre and post-PCAS fully completed the instrument. The mean age of the students who completed both the pre and post-PCAS was 23.34 (SD=3.91), 59 percent were female, and 71 percent had some pharmacy work experience.

The pre-scores for the students were 12.61 (SD=1.63), 8.10 (SD=1.38), and 32.63 (SD=3.96) for the “professional duty,” “return on effort,” and “professional benefit” scales, respectively. The post-scores for the students were 14.52 (SD=0.71), 8.89 (SD=0.98), and 35.97 (SD=2.34) for the “professional duty,” “return on effort,” and “professional benefit” scales, respectively. There was a significant difference between pre and post-scale scores components (P<0.001) and differences were detected between the pre and post-scores for all 13 items of the PCAS except for the “Clerk” item. See Table 1 for pre and post-scores. The Cronbach coefficient alpha was 0.85,
Table I. Means and standard deviations of pre and post items and factor scores

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-score (n=95)</th>
<th>Post-score (n=95)</th>
<th>Change in mean pre- and post-scores (n=95)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All pharmacists should perform pharmaceutical care.</td>
<td>4.25±0.68</td>
<td>4.74±0.44</td>
<td>0.49</td>
<td>0.001</td>
</tr>
<tr>
<td>2. Pharmacists in all health care settings primary responsibility</td>
<td>4.22±0.67</td>
<td>4.83±0.38</td>
<td>0.61</td>
<td>0.001</td>
</tr>
<tr>
<td>3. Pharmacists primary responsibility should be to practice</td>
<td>4.14±0.66</td>
<td>4.95±0.22</td>
<td>0.81</td>
<td>0.002</td>
</tr>
<tr>
<td>4. Providing pharmaceutical care takes too much time and effort.</td>
<td>1.97±0.76</td>
<td>1.48±0.63</td>
<td>0.49</td>
<td>0.001</td>
</tr>
<tr>
<td>5. Providing pharmaceutical care is not worth the additional</td>
<td>4.07±0.78</td>
<td>4.37±0.60</td>
<td>0.30</td>
<td>0.001</td>
</tr>
<tr>
<td>6. Pharmacy students can perform pharmaceutical care during their</td>
<td>4.13±0.69</td>
<td>3.98±0.65</td>
<td>-0.13</td>
<td>0.277</td>
</tr>
<tr>
<td>7. I think the practice of pharmaceutical care is valuable.</td>
<td>3.98±0.65</td>
<td>4.35±0.76</td>
<td>0.37</td>
<td>0.001</td>
</tr>
<tr>
<td>8. I would like to perform pharmaceutical care as a pharmacist</td>
<td>4.06±0.78</td>
<td>4.77±0.42</td>
<td>0.71</td>
<td>0.001</td>
</tr>
<tr>
<td>9. Providing pharmaceutical care is professionally rewarding.</td>
<td>4.14±0.79</td>
<td>4.83±0.38</td>
<td>0.69</td>
<td>0.001</td>
</tr>
<tr>
<td>10. I feel that pharmaceutical care is the right direction for the</td>
<td>4.09±0.74</td>
<td>4.58±0.50</td>
<td>0.49</td>
<td>0.001</td>
</tr>
<tr>
<td>11. I feel that the pharmaceutical care movement will benefit</td>
<td>4.07±0.69</td>
<td>4.60±0.55</td>
<td>0.53</td>
<td>0.001</td>
</tr>
<tr>
<td>12. I feel that the pharmaceutical care movement will improve</td>
<td>4.11±0.73</td>
<td>4.41±0.49</td>
<td>0.30</td>
<td>0.001</td>
</tr>
<tr>
<td>13. I feel that practicing pharmaceutical care would benefit my</td>
<td>4.05±0.71</td>
<td>4.45±0.71</td>
<td>0.40</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Scale: 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree.

aItem loading on the “Professional duty” factor.
bItem loading on the “Return on effort” factor.
cItem loading on the “Professional benefit” factor.
dThere was a statistical difference (P <0.05/16 which is equivalent to P <0.003) between the pre- and post-scores of the items. The Bonferroni correction was applied to keep the overall alpha for 16 (13 survey items and 3 survey scales) comparison tests at 0.05.

0.80, and 0.77 for the professional benefit,” “professional duty,” and “return on effort” scales, respectively.

**DISCUSSION**

The Commission to Implement Change in Pharmaceutical Education states that the mission of pharmacy practice is to render pharmaceutical care(18,19). In response to this challenge, the CAIL course was designed to use actual patient participation to create a sense of realism about managing patients' diseases, relate pharmacy practice concepts, and promote the practice of pharmaceutical care through student-patient interaction. One of the major goals of the CAIL course was to teach students the importance of not only having medical knowledge but also the importance of developing an appreciation for the significant role they can play as pharmacists. The coordinator of the CAIL course believed that the use of actual patients in the classroom would instill into the students a sense of responsibility for patients' pharmacotherapeutic outcomes and the need to provide pharmaceutical care throughout their career. During the three week course, students' attitudes toward pharmaceutical care became more positive (PO.003). Results suggest that the CAIL course was successful in positively influencing students' attitudes toward pharmaceutical care as indicated by the increasing post-scores compared to the pre-scores on 12 of the 13 items of the PCAS. Upon further examining the 13 items of the PCAS and the study findings, the “clerk” item was the only item in which a significant change was not found between students' pre and post-item scores, thus providing additional support to our assertion that the “clerk” item may not be appropriate for students who have not had clerkship experience.

Since the CAIL course is a required course in the College’s curriculum and the second, third, and fourth-year professional pharmacy students in the College had already taken the CAIL course, it was impossible to have a control group in this setting. Although students’ PCAS scores did increase over the CAIL course period, with the limitation of not having a control group it was impossible to contribute the increase in PCAS scores directly to the CAIL course or to the patient presentations in the CAIL course. However, by using each student as his/her own control, it can be concluded with a high degree of certainty that students’ PCAS scores definitely increased during the course. Since the students were taking a drug information course, a pharmaceutical calculations course, and a United States (U.S.) health system course concurrent with the CAIL course, the change in students’ PCAS scores was most likely due to the CAIL course, as these other courses did not deal with concepts of pharmaceutical care. Furthermore, these students were enrolled in the pharmaceutical calculations and the U.S. health system courses for 12 weeks prior to the administration of the pre-PCAS, therefore, the likelihood of these courses positively affecting students’ attitudes toward pharmaceutical care was remote. Since greater than 95 percent of the course involved the use of actual patients it strongly suggests patients positive influence on students’ pharmaceutical care attitudes.

Another limitation to the study is that scores on the PCAS have not been correlated with actual student provision of pharmaceutical care. However, many students who have been involved in the CAIL course and who are currently on experiential training have commented to the coordinator of the CAIL course and to many other instructors at the College that the course was a profound experience. Students often recall the impact of having real patients in the classroom discussing their diseases. This further suggests that the CAIL course positively influenced students’ willingness and desire to provide pharmaceutical care to patients.

Although the results generated from this investigation are limited to the study population and institution, the influence of the use of actual patients in the classroom in this study has
implications to pharmacy education and to the profession of pharmacy. First, it provides pharmacy educators with a teaching methodology that introduces students to real patients and facilitates student-patient interaction skills early in students’ pharmacy education opposed to latter. Second, it demonstrates the positive effects that patients can have on the development of pharmacy students attitudes. Third, programs and courses such as CAII may produce practitioners who have a strong desire to perform pharmaceutical care activities.

CONCLUSION

Negative attitudes are a barrier to performing pharmaceutical care. In hopes of enhancing the practice of pharmaceutical care, a course which involves actual patients describing their diseases to first-year pharmacy students in a classroom setting was implemented and evaluated for its affects on students’ pharmaceutical care attitudes. Results suggest that the Clinical Applications II course positively influenced students’ pharmaceutical care attitudes.

By sharing the positive outcomes of the Clinical Applications II course, the investigators hope that others will implement such educational programs. Receiving patient-centered programs early in students formal didactic pharmacy education promotes the development of more positive attitudes concerning pharmaceutical care. Longitudinal studies determining the duration of the positive effects of programs on students’ and practitioners’ attitudes toward pharmaceutical care are needed. This study serves as a starting point for the development of future courses and evaluative studies assessing programs that may positively influence students’ attitudes concerning pharmaceutical care.

Acknowledgement. We would like to thank all the patients who participated in the Clinical Applications II course for their willingness and sincere interest in educating pharmacy students.


References

APPENDIX. PCAS SCALES AND DESCRIPTION OF ITEMS

Professional Duty (PD)
Should: All pharmacists should perform pharmaceutical care.
Pre_Solv: Pharmacists in all health care settings primary responsibility should be to prevent and solve medication-related problems.
Practice: Pharmacists primary responsibility should be to practice pharmaceutical care.

Return on Effort (ROE)
Time: Providing pharmaceutical care takes too much time and effort.
Add_Work: Providing pharmaceutical care is not worth the additional workload that it places on the pharmacist.

Professional Benefit (PB)
Clerk: Pharmacy students can perform pharmaceutical care during their clerkships.
Value: I think the practice of pharmaceutical care is valuable.
Like: I would like to perform pharmaceutical care as a pharmacist practitioner.
Reward: Providing pharmaceutical care is professionally rewarding.
Direction: I feel that pharmaceutical care is the right direction for the profession to be headed.
Benefit: I feel that the pharmaceutical care movement will benefit pharmacists.
Improve: I feel that the pharmaceutical care movement will improve patient health.
Career: I feel that practicing pharmaceutical care would benefit my professional career as a pharmacy practitioner.

Scale: 1 = Strongly disagree; 2 =Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree.