

Comparison of the Effectiveness of Traditional Lecturing and a Patient-Based Approach in Pharmacy Students' Ability to Apply Revised Treatment Guidelines for Hypertension

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The primary purpose of this study was to compare traditional lecturing (TL) to a patient-based approach (PBA) in students' ability to evaluate hypertensive patients. A second aim of this study was to determine whether students perceived greater value in learning using PBA versus TL. For four consecutive sessions, students in community pharmacy clerkships (CPC) evaluated hypertensive patients based on national treatment guidelines. Only students in CPC during the last two semesters received a lecture on the revised guidelines (TL). Students (n= 284) evaluated 821 patients. Correct evaluations in the PBA and TL groups were 68 percent and 66 percent, respectively. Differences existed in perceptions of the project as a valuable experience (PBA 89 percent vs. TL 75 percent, $P = 0.007$) and its usefulness as a teaching method (PBA 82 percent vs. TL 69 percent, $P = 0.021$). Students demonstrated similar critical thinking abilities, but perceived greater value in learning by PBA than TL.

INTRODUCTION

In 1997, the American Council on Pharmaceutical Education (ACPE) recommended that pharmacy education provide for basic outcomes/competencies including critical thinking, scientific comprehension, communication, and problem solving skills(1). The use of educational methodologies such as problem-based learning (PBL) may help students develop these competencies and foster life-long learning. Following a review of the literature on PBL, Albanese and Mitchell defined PBL as "an instructional method characterized by the use of patient problems as a context for students to learn problem-solving skills and acquire knowledge about the basic and clinical sci-ences"(2). In this approach, the problem is presented prior to the student learning the concepts(2). Faculty involved with PBL function as facilitators rather than lecturers.

In medical education, PBL has been utilized for more than

30 years and although much has been published on the effectiveness of PBL, few well-controlled studies have been documented(3). In two meta-analyses of data from studies, primarily in the medical literature, PBL provided educational advantages in certain areas(2,4). In particular, clinical performance was enhanced in students exposed to PBL as compared to traditional teaching methods(2,4).

Similar to medical education, pharmacy education faces the challenge of attempting to accommodate a growing volume of knowledge into existing curricula. An increasing number of colleges and schools of pharmacy have incorporated PBL or similar educational strategies into selected parts of their curricula(5-12). However, most literature available to-date is descriptive in nature. The impact of PBL on pharmacy educa-

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tion has not been formally and adequately evaluated by studies with control groups examining clearly defined short-term or long-term outcomes.

During the process of implementing an entry-level PharmD curriculum at our college, one of the goals was to develop and use new teaching strategies in order to nurture students' problem-solving skills and critical thinking abilities. It was hoped that students will be better able to accommodate the rapidly growing volume of pharmaceutical knowledge and be better equipped to provide pharmaceutical care. One of the portions of the curriculum where PBL can be logically implemented is clinical clerkships. During clerkships, students need to master the skill of collecting essential information from patients and organizing and evaluating the data to develop pharmaceutical care plans. This study was aimed at comparing a modified PBL, patient-based approach (PBA), with traditional lecturing (XL) in pharmacy students' ability to solve clinical problems during a community pharmacy clerkship. We defined the teaching strategy used in this study as PBA rather than of PBL because the disease state that students were asked to evaluate was hypertension (see methodology for details), a topic on which all students had received some didactic instruction. The difference between the PBA group and the TL group was that students in the TL group had been taught the most recent treatment guidelines whereas the PBA group was taught an earlier version of the treatment guidelines. The students in the PBA group had to learn the new guidelines on their own. The secondary objective was to evaluate the educational value of student participation in a research project during their community pharmacy clerkship.

During the process of designing an entry-level PharmD curriculum, the authors conducted this evaluation of PBA and TL in the Bachelor of Science (BS) in pharmacy program. Implementation of curriculum-wide PBA (or PBL) would require a tremendous commitment from the faculty and administration. Therefore, before determining the extent to which PBA should be incorporated into the entry-level PharmD curriculum, it was important to demonstrate the impact PBA had on students' ability to solve clinical problems. Additionally, as consumers of education it was critical to evaluate the students' perceptions of PBA.

METHODS

This was a prospective study to compare TL and PBA in pharmacy students' ability to apply the Sixth Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) guidelines(13) to evaluate hypertensive patients. As part of an antihypertensive therapy utilization program carried out by the university, fifth year BS in pharmacy students enrolled in a community pharmacy clerkship during a 16-month (four university semesters, September 1998 through December 1999) period were asked to evaluate hypertensive patients as part of their daily clerkship activities. Data collected from patients during this period were used to evaluate antihypertensive therapy utilization in the New York metropolitan area and has been published previously(14). The entire study was approved by the University's Institutional Review Board.

The current report focuses on the educational aspects of the study. In order to adequately prepare students for subject enrollment and data collection, pre-clerkship lecture and laboratory sessions were conducted at the beginning of each semester. Students received a one-hour lecture on general aspects of

managing patients with hypertension, details of the research study, and basic principles in clinical pharmacy research including obtaining informed consent. No specific details of the JNC VI report were discussed in the lecture. In the one-hour laboratory session, students practiced using sphygmomanometers to accurately measure blood pressure.

After informed consents were obtained, patients were interviewed by pharmacy students using a standard questionnaire. Information obtained from patients included demographic data, past medical and medication histories, and drug allergies. Information regarding patients' health insurance coverage, type of physician prescribing the antihypertensive medications, the patients awareness of the severity of their hypertension when first diagnosed, and the rationale of the choice of their therapy were also obtained. Any previous adverse drug reactions also were recorded. Patient self-reported medication adherence was evaluated. Pharmacy students also offered to measure blood pressure for the patients and verified drug allergies and current medication profiles with the records in the pharmacy. Details of this portion of the study have been previously published(14).

With the information collected, students evaluated the appropriateness of the patient's antihypertensive therapy based on the JNC VI guidelines(13). A form providing guidelines for evaluation was developed (Appendix A). Based on the criteria, students assessed whether patients' current therapies were appropriate. Students' assessments were compared to those made by two faculty members. Percentages of correct assessments by students were reported.

Students also completed a questionnaire (Appendix B) evaluating their perceptions of participation in the hypertensive patient evaluation project at the end of the clerkship. The first part of the questionnaire was comprised of 12 items to which students responded on a five-point Likert-type scale of agreement. The items represented various skill sets and points of knowledge to which participation in the project were designed to enhance. For example, in the second part of the questionnaire, students were asked to provide answers to three global assessments soliciting their opinions on the value of the project as a learning experience, its effectiveness as a teaching method, and upon whether they would participate in another similar research study if given the opportunity (see Appendix B).

Student Grouping

To study the effect of TL versus PBA in students' ability to evaluate hypertensive patients based on the JNC VI guidelines, students were divided into two groups. The PBA group consisted of those students who completed their community pharmacy clerkship during the fall 1998 and spring 1999 semesters (September 1998 to May 1999). The TL group consisted of those students who completed their community pharmacy clerkship during the summer 1999 and fall 1999 semesters (June 1999 to December 1999).

Hypertension was usually taught in the Pharmacotherapeutics II course offered in the fall semester each year, during the fourth year of the BS in pharmacy curriculum. Students began their clerkship no sooner than six months after completing this course. Since the JNC VI guidelines were published in November 1997, only students in community pharmacy clerkship during summer 1999 and fall 1999 received formal lectures on JNC VI (TL group). Students in community pharmacy clerkships in fall 1998 and spring 1999

Table I. Distribution of students and patients

Groups	Number of students	Number of patients evaluated
PBA	107	307
TL	177	514
Total	284	821

Abbreviations: PBA, patient-based approach; TL, traditional lecturing.

(PBA group) learned JNC V in class and had to learn the JNC VI guidelines during clerkships, while evaluating patients.

Data Analysis

Data were input SPSS—PC, Version 10.0 for analysis(15). AP-value equal to or less than 0.05 was considered statistically significant. Using specific criteria based on the JNC VI guidelines, students were asked to evaluate if patients' antihypertensive therapies were appropriate (Appendix A). Two faculty members used the same guidelines to determine if students' assessments were correct. Students' ability to evaluate antihypertensive therapy was dichotomized into either having made a "correct" versus an "incorrect" assessment and dummy coded as "1s" and "0s" respectively for purpose of analysis. The proportion of students making correct assessments in the TL and the PBA groups were compared with the use of a chi-square test.

In evaluating students' perceptions of participating in the project, a series of steps was undertaken to ensure that respondents' answers were internally consistent and that each item in the scale made a valid contribution toward the measure. A Cronbach's alpha was calculated for the entire scale as a measure of the scale's internal consistency. Additionally, an item analysis was performed to determine each item's correlation to the scale total and a re-calculation of the Cronbach's alpha without that respective item to determine if its removal improved the scale's consistency.

Responses by TL and PBA students to the scale were compared with the use of independent sample t-tests, which were conducted for each item and the overall scale. Separate exploratory, principal components factor analysis procedures were conducted on the responses to the scale by TL and PBA students to compare the underlying dimension(s) of their perceptions toward participating in the project. The proportion of affirmative responses among the two groups to the three forced-choice questions was compared using of chi-square tests. Additionally, their responses to these questions were used as dependent variables in discriminant function analyses to assess the predictive validity of the 12 scale items.

RESULTS

Students' Evaluation of Hypertension Medication Regimens

Two hundred and eighty four students (TL: 177, PBA 107) completed community pharmacy clerkships during these four semesters. A total of 821 patients were evaluated (Table I). In the PBA group, 68 percent of the student assessments of patients' antihypertensive regimens were accurate, and in the TL group, 66 percent of the assessments were accurate. The difference was not statistically significant (Table II). Of the incorrect assessments, 96 percent were made due to students' assumption of the equivalence of controlled blood pressure to appropriate regimens. Reasons for the remaining (four per-

Table II. Students' assessment of patients

Groups	Accurate assessments (%)	Inaccurate assessments (%)
PBA	208 (68)	99 (32)
TL	342 (66)	172 (34)

$\chi^2 = 0.1284$, $df = 1$, $P = ns$

Abbreviations: PBA, patient-based approach; TL, traditional lecturing.

cent) inaccurate assessments could not be determined. It was concluded that students who learned pharmacotherapeutics information in a TL setting compared to those who had to learn the same information on their own during clerkships (*i.e.*, PBA) developed the same ability to evaluate patients with hypertension.

Students' Perceptions of Participating in the Project

The Cronbach's alpha calculated for the entire 12-item scale was 0.93, providing evidence of very high internal consistency. Corrected item-to-total correlations ranged from 0.60 to 0.75. The Cronbach's alpha failed to improve with the deletion of any scale item, therefore all 12 items were retained for subsequent analysis.

Responses to the scale by students in the TL ($n = 169$; 95.5 percent response rate) and PBA ($n = 106$; 99.1 percent response rate) groups are provided in Table III. Students in both groups moderately agreed with each of the item statements and thus saw at least some value in participating in the project. Students in the PBA group provided more favorable responses to each of the 12 items, with significant differences observed in seven of the 12 items and in the overall scale mean. The items to which responses were significant represented concepts such as interest in clinical research, an expanded vision of pharmacy practice, an enhancement of the understanding of the many factors that affect physician prescribing patterns and most notably, an increase in the understanding of JNC VI guidelines.

Interestingly, the factor structure from the two principal components analyses differed somewhat. The responses by the TL group to the scale all loaded onto one factor explaining 55.8 percent of the variability. On the other hand, responses by the PBA group loaded onto two separate factors explaining a total of 68 percent of the variability. Factor one, explaining 57.9 percent of the variability, was comprised of items six through twelve. Factor two, accounting for an additional 10.1 percent of the variability, was comprised of items one through five. Thus, while TL students viewed the benefits of participating in the project with one domain, PBA students compartmentalized the benefits into two domains: one being more "practice" oriented and the other being more "research" oriented.

Students' answers to the three global assessment questions are summarized in Table IV. A greater proportion of students in the PBA group responded affirmatively to questions soliciting their opinion of participating in the program being a valuable learning experience (89.2 vs. 75.2 percent, $\chi^2 = 7.31$, $df = 1$, $P = 0.007$) and the use of the program as an effective teaching method (81.9 vs. 68.6 percent, $\chi^2 = 5.31$, $df = 1$, $P = 0.021$). Approximately the same proportion of students indicated that they would be willing to participate in another similar project if given the opportunity (70.2 vs. 64.2 percent, $\chi^2 = 0.93$, $df = 1$, $P = 0.335$). Results of the discriminant function analyses indicated that responses by students to the 12-item scale accurately predicted their responses to the three global assessments. Scale

Table III. Students' mean responses to the scale assessing perceptions toward participating in the project^a

Scale item	TL group	PBA group	t	Sig.
1. Provided me with an introduction to clinical research.	3.47	3.75	2.33	0.02
2. Taught me the importance of obtaining informed consent from patients.	3.75	3.95	1.79	0.07
3. Stimulated my interest in clinical research.	3.03	3.30	2.05	0.04
4. Gave me a better idea of what is involved in doing research.	3.41	3.76	2.82	0.01
5. Helped me understand the importance of doing clinical research.	3.29	3.61	2.61	0.01
6. Improved my patient interviewing skills.	3.96	4.08	0.96	0.34
7. Expanded my vision of pharmacy practice.	3.53	3.83	2.38	0.02
8. Increased my knowledge on the proper use of sphygmomanometers.	3.81	3.94	0.94	0.35
9. Provided me with a greater understanding of hypertension management.	3.71	3.88	1.32	0.19
10. Increased my understanding of JNC guidelines.	3.67	3.96	2.25	0.03
11. Provided me with insight into why some patients are not compliant with their medications.	3.79	3.84	0.42	0.67
12. Enhanced my knowledge of the many factors that can affect physician prescribing patterns.	3.47	3.73	2.08	0.04
Overall	42.83	45.82	2.61	0.01

^a Responses to a five-point scale from 1 = strongly disagree to 5 = strongly agree in which participants were asked "My participation in this research study . . ." *Abbreviations:* JNC, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; PBA, patient-based approach; TL, traditional lecturing.

Table IV. Responses to the global assessment questions in part 2 of the survey

Question	TL group ^a		PBA group ^b	
	Yes (%)	No (%)	Yes (%)	No (%)
My participation in this study was a valuable learning experience.	115(75.2)	38(24.8)	83(89.2)	10(10.8)
I would participate in another research study if given the opportunity.	97(64.2)	54(35.8)	66(70.2)	28(29.8)
Having students participate in a research project is an effective method of teaching.	105(68.6)	48(31.4)	77(81.9)	17(18.1)

^a Any total of responses less than 177 from the TL is indicative of missing data.

^b Any total of responses less than 107 from the PBA is indicative of missing data.

responses predicted whether students perceived the project as a valuable learning experience with 78.6 percent accuracy, their evaluation of the program as an effective teaching method with 79.9 percent accuracy, and their willingness to participate in a similar project with 76.8 percent accuracy. These results lend evidence to the content validity of the 12-item scale.

DISCUSSION

Pharmacotherapeutics knowledge continues to expand. Faculty at colleges and schools of pharmacy find it increasingly difficult to incorporate all the important material into confined class hours. It is thus important to develop innovative teaching methods and settings for students to develop strong problem-solving and critical thinking skills, in order to become life-long learners. Numerous pharmacy programs have incorporated the use of small group recitation, problem-based learning sessions, and/or other methods to nurture students' ability to solve clinical problems(5-12). Clerkships have been historically considered a perfect setting for developing students' critical thinking and problem solving skills. The requirement to manage real

patients simulates a problem-based learning setting. Further, involvement of students in a clinical research project has been recognized as one method to help further develop students' critical thinking ability(16,17).

In this study, it was found that students who received traditional lectures and those who self-taught had similar ability to evaluate hypertensive patients. Students that self-taught (PBA group) received a lecture on JNC V guidelines(18) and then at least six months later the students evaluated hypertensive therapy based upon JNC VI guidelines. The changes in the guidelines that occurred between JNC V and VI are significant and include: (i) Definition of different stages of hypertension; (ii) The new patient risk stratification approach in determining treatment and blood pressure goals; (iii) The addition of drug of choice for compelling indications; and (iv) greater emphasis on diet and lifestyle modification. The fact that the PBA group performed as well as the TL group demonstrates life-long learning skills. In particular, the students relied upon their critical thinking and problem solving skills to adapt to the new treatment guidelines for hypertension.

It was also observed that students who self-taught perceived a greater value in the educational experience and expressed a greater degree of confidence that participating in a research project increased their skills in several areas. These results should reassure faculty that it is not necessary to squeeze all therapeutic topics into confined therapeutic courses. Certain selected topics can be left for students to self-learn without compromising their ability to evaluate patients with those disease states. It may be prudent, however, to select topics for self-learning that have clearly defined treatment paradigms, such as hypertension.

A previous study by the authors evaluated the use of a research project as a learning experience for pharmacy students. In this study, students collected demographic data, medical and medication history as well as cholesterol levels of community pharmacists(17). Pharmacists were also asked to complete a questionnaire evaluating their knowledge of cholesterol management. The questions were designed to resemble those frequently asked by patients. The results of the study indicated that pharmacists, like physicians and nurses, can be used as a potential source of health-related epidemiologic data. However, community pharmacists' knowledge of cholesterol management was of concern, the below average scores indicated that continuing education may be needed to enhance pharmacists ability to manage patients with hypercholesterolemia. However, from an educational standpoint, similar to the present study, students reported that participation in a clinical research project was a valuable learning experience.

Several limitations of the present study that prevent extrapolation of the results beyond the study population should be considered. For one, student demographic was not obtained. The possibility that some students may have had previous experience with patient-based or problem-based learning cannot be eliminated. Prior experience in PBL would provide students with better critical thinking ability and problem-solving skills at baseline. Therefore if students in the PBA group had prior PBL experience, it could account for the ability of the PBA group to perform as well as the TL group.

Secondly, it was also possible that students in the PBA group might have attended a formal lecture regarding the JNC VI guidelines from sources other than required courses, such as a continuing education program or elective courses. If that was the case, it could explain the lack of difference between the two groups.

Thirdly, the academic standing and other characteristics of students, such as traditional versus non-traditional (adult learner pursuing pharmacy as a second career) students in the two groups were not assessed. However, since assignments to community clerkships at our university were done using a random lottery method, such difference should be minimal.

Fourth, hypertension management is generally considered evidence-based, systematic and guideline driven. This type of disease state may be easier for students to self-learn than other types of disease states for which their management may be more controversial. In addition, the PBA group did receive a formal lecture on JNC V guidelines. Therefore, students only needed to learn the updates/changes, which may have made the self-learning process simpler. In contrast, students in the TL group learned JNC VI guidelines at least six months prior to their clerkships. The students might have forgotten some details regarding the guidelines, thus putting them in the same position as the PBA students in terms of having to re-learn the guidelines during their clerkship. In either case, students were

provided the JNC VI reference and the website and were asked to consult them while evaluating patients. Students were also encouraged to discuss individual patient cases with the faculty members involved in this study or their clerkship preceptors. However, the critical thinking and problem-solving abilities were not specifically examined.

Finally, as this study employed a longitudinal design without the use of concomitant controls, the results could have been affected by historical events. For example, certain groups of students and even entire classes of students may enter certain courses and experiential rotations with varying positive or negative predispositions based upon their prior educational experiences at the College or from feedback and hearsay circulated by their peers. The authors cannot preclude the possibility that the more favorable responses obtained from the PBA group to the assessment questionnaire was not due to attitudes or events that were unrelated to the differing educational styles employed.

CONCLUSIONS

Providing the appropriate, structured setting, students who self-taught using a patient-based approach and those who received traditional lectures had similar ability to evaluate hypertensive patients. With many schools facing curriculum overload, incorporating PBA or PBL into clerkships for selected topics may be an alternative to didactic instruction. Importantly, the students perceived both the PBA approach and the use of a research project during clerkship as valuable teaching methods.

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immediately or within 1 week depends on clinical situation.

When SBP and DBP fall into different categories, the higher category should be adapted.

APPENDIX A. EVALUATION GUIDELINES

Extern Pharmacy Date

ASSESSMENT OF PATIENT BLOOD PRESSURE MANAGEMENT

You are required to offer to measure the patient's blood pressure. If this is performed, record the following:

Date Performed: _____ Time Performed: _____

Blood Pressure _____

If test repeated, what is the second blood pressure obtained:

2. EXTERN REMARKS: (any special concern that you may have regarding the above blood pressure readings that you think may affect the accuracy of the measurements)
3. Based on the following staging system from the JNC VI guidelines, what category is your patient's hypertension?

Category	Initial screening (mmHg)		
Systolic	Diastolic	Follow-up recommendation	
Optimal	<120	<80	Recheck in 2 years
Normal	<130	<85	Recheck in 2 years
High-normal	130-139	85-89	Recheck in 1 year
Hypertension			
Stage 1	140-159	90-99	Confirm within 2 months
Stage 2	160-179	100-109	Evaluate and refer for care within 1 month
Stage 3	ISO	110	Evaluate and refer for care

4. For patients refilling antihypertensive prescriptions only: Is your patient's blood pressure well controlled by his/her current medication?

Yes No

If no, what do you think may be the contributing factors (check all apply):

- Wrong drug of choice
- Wrong dose
- Wrong administration technique
- Side effects
- Patient non-compliant
- Drug interactions lead to diminishing medication effect
- Others, please explain _____

5. Based on the JNC VI recommendation and your patient's past medical and medication history, do you think he/she is on the most appropriate antihypertensive regimen?

(See next page for more JNC VI recommendations)

Yes No

If no, what should this patient be receiving for hypertension treatment?

Why do you think your recommendation is better?

6. Considering all factors, do you think this patient is on the most appropriate treatment plan for hypertension?

Yes No

If no, why? (Check all apply)

- Inappropriate antihypertensive agent .
- Inappropriate antihypertensive dose (Circle one: subtherapeutic or supertherapeutic)
- Inconvenient dosing schedule
- Patient experiencing or is prone to certain side effects
- Presence of drug-drug interaction
- Presence of drug-disease interaction
- Inappropriate dosage form
- Patient require life style modification (aow fat/ low salt diet, stress reduction, smoking cessation, weight loss)
- Patient needs to be better educated about his/her disease states and medications. Others:

Individualized Antihypertensive Agents Based on Co-Existing Diseases. First Line: Diuretics or Beta-blockers if No Other Contraindications

Indication

Compelling indications unless contraindicated

- Diabetes (type 1) with proteinuria
- Systolic heart failure
- Isolated systolic hypertension (elderly)
- Myocardial infarction May have favorable effects on comorbid conditions
- Angina
- Atrial tachycardia and fibrillation
- Diabetes (types 1 and 2) with proteinuria
- Dyslipidemia
- Essential tremor
- Systolic heart failure
- Hyperthyroidism
- Migraine
- Myocardial infarction
- Osteoporosis

Drug Therapy

ACE I

- ACE I, diuretics
- diuretics (preferred), CCB (long acting dihydropyridine)
- Beta-blockers (non-ISA), ACE I

Beta-blockers, CCB

Beta-blockers, CCB (non-dihydropyridine)

ACE I (preferred), CA

Alpha-blockers

Beta-blockers (non-cardioselective)

amlodipine, carvedilol, losartan

Beta-blockers

Beta-blockers (non-cardioselective, CCB (non-dihydropyridine)

Diltiazem, verapamil

Thiazides

Preoperative hypertension Prostatism (BPH)	Beta-blockers Alpha-blockers
May have unfavorable effects on co-morbid conditions Asthma, COPD Depression	Beta-blockers
Diabetes (type 1 and 2) Dyslipidemia	Beta-blockers, central alpha-agonists, reserpine
Gout	Beta-blockers, high dose diuretics
Second and third degree heart block Systolic heart failure	Beta-blockers (non-ISA), diuretics (high dose) Diuretics
Liver disease	Beta-blockers, CCB (non-dihydropyridine)
Peripheral vascular disease	Beta-blockers (except carvedilol), CCB (except amlodipine and felodipine)
Pregnancy	Labetolol, methyldopa Beta-blockers ACE I, angiotensin II receptor blockers

ACE I: Angiotensin Converting Enzyme Inhibitors; BPH: Benign Prostate Hypertrophy; CCB: Calcium Channel Blockers COPD: Chronic Obstructive Pulmonary Disease; ISA: Intrinsic Sympathomimetic Activity.

APPENDIX B. STUDENT QUESTIONNAIRE

The following questionnaire was developed to assess the hypertension research study you participated in during your community externship. Data from this questionnaire CANNOT be used unless you answer ALL of the following questions. All answers will remain anonymous.

Part 1: Indicate your level of agreement with each of the following statements about your participation in the hypertension research study by circling the corresponding number to the right of each statement (from 1 = strongly disagree to 5 = strongly agree)

My participation in this research study:

	Strongly disagree			Strongly agree	
1. Provided me with an introduction to clinical research.	1	2	3	4	5
2. Taught me the importance of obtaining informed consent from patients.	1	2	3	4	5
3. Stimulated my interest in clinical research.	1	2	3	4	5
4. Gave me a better idea of what is involved in doing research.	1	2	3	4	5
5. Made me understand the importance of doing clinical research.	1	2	3	4	5
6. Improved my patient interview skills.	1	2	3	4	5
7. Expanded my vision of pharmacy practice.	1	2	3	4	5
8. Increased my knowledge of the proper use of sphygmomanometers.	1	2	3	4	5
9. Provided me with a greater understanding of hypertension management.	1	2	3	4	5
10. Increased my understanding of JNC guidelines.	1	2	3	4	5
11. Provided me with insight into why some patients are not compliant with their medications.	1	2	3	4	5
12. Enhanced my knowledge of the many factors that can affect physician prescribing pattern.	1	2	3	4	5

Part 2: Answer the following two questions by circling "yes" or "no,"

1. My participation in this study was a valuable learning experience.
YES NO
2. I would participate in another research study if given the opportunity.
YES NO
3. Having students participate in a research project is an effective method of teaching.
YES NO