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INSTRUCTIONAL DESIGN AND ASSESSMENT

Shared-Learning Experience During a Clinical Pharmacy Practice Experience

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Objective. To implement a shared learning approach through fourth-year students' mentorship of third-year students and to assess the perceptions of the mentored students on the value of their shared learning experience.

Design. We introduced the shared learning experience in clinical pharmacy and pharmacotherapeutic practice experiences involving 87 third-year and 51 fourth-year students. Both student groups undertook the practice experiences together, with third-year students working in smaller groups mentored by fourth-year students.

Assessment. A majority of the students (> 75%) believed that they learned to work as a team during their practice experiences and that the shared learning approach provided an opportunity to practice their communication skills. Similarly, most respondents (> 70%) agreed that the new approach would help them become effective members of the healthcare team and would facilitate their professional relationships in future practice. Almost two-thirds of the students believed that the shared learning enhanced their ability to understand clinical problems. However, about 31% of the pharmacy students felt that they could have learned clinical problem-solving skills equally well working only with peers from their own student group.

Conclusions. The pharmacy students in the current study generally believed that the shared-learning approach enhanced their ability to understand clinical problems and improved their communication and teamwork skills. Both groups of students were positive that they had acquired some skills through the shared-learning approach.

Keywords: shared learning, pharmacy education, pharmacy practice experience, patient assessment, therapeutics

INTRODUCTION

Experiential training, such as the clinical pharmacy practice experience, remains integral to the pharmacy curriculum. By serving as an opportunity for students to practice patient care, clinical practice experiences are an ideal environment for students to fully learn and actively apply the knowledge and skills acquired during the classroom/lecture-based components of their undergraduate pharmacy program.[1] With the guidance of hospital and faculty preceptors, students in clinical practice experiences conceptualize the role of pharmacists in delivering effective pharmaceutical care.

Many innovative approaches, including interdisciplinary work[1,2] and fourth-year student mentorship of third-year and even first-year students,[3,4] have been used by pharmacy colleges and schools to accomplish the objectives of clinical practice experiences through shared learning. One study showed that mentorship with senior pharmacy students resulted in junior pharmacy students significantly improving in their patient presentation skills, developing professional writing skills, and learning how to work-up and monitor patients and perform patient education.[5] As an innovative strategy that enhances quick learning of clinical, communication, and collaborative skills for pharmacy students, the shared learning approach in clinical pharmacy practice experience is believed to enhance the students' educational experience.

The Faculty of Pharmacy at the International Islamic University Malaysia (IIUM) implemented shared learning between the fourth- and third-year pharmacy students during the 2009-2010 academic session. The 2 groups of students undertook clinical pharmacy practice experiences together, with students working in small groups in which fourth-year students mentored third-year students.

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This approach was hypothesized to provide the younger students practical experience in identifying and resolving drug-related problems using clinical pharmacy skills and demonstrating good bedside manners with the objective of alleviating the third-year students' anxiety and uncertainty about these competencies. The fourth-year mentors were expected to be sufficiently knowledgeable about pharmacotherapeutics to guide their younger counterparts. We expected that fourth-year students' communication and teamwork skills would improve as a result of their mentoring role and that the experience would significantly help them adapt to working life, especially in the early stages of their pharmacy practice.

The current survey was designed to assess how well the third- and fourth-year students perceived and accepted the shared learning experience and to explore the strengths and weaknesses of this strategy in pharmacy education.

DESIGN

Students of the Faculty of Pharmacy at the IIUM take Clinical Pharmacy II during the third undergraduate year and Pharmacotherapeutics II during the fourth (final) year. Both courses are offered during Semester II of every academic calendar. In Clinical Pharmacy II, students learn to assess signs and symptoms of selected medical conditions, while in Pharmacotherapeutics II, they learn about the pharmacotherapy of selected disease states. Lecture topics and clinical assignments at the hospital for the courses are parallel and include endocrine, musculoskeletal, neurological and psychiatric, neoplastic, infectious and dermatological disorders. Prior to taking these courses, third-year students complete Clinical Pharmacy I and fourth-year students complete Pharmacotherapeutics I during the first semester of the same academic year. However, these 2 courses are not prerequisites for Clinical Pharmacy II and Pharmacotherapeutics II, as they cover different therapeutic areas and clinical assignments such as cardiopulmonary, hepatobiliary, gastrointestinal, genitourinary, and renal diseases.

The current shared learning experience involved 87 third-year students and 51 fourth-year students. During the first semester, students attended clinical assignments at the hospital on separate days for their Clinical Pharmacy I and Pharmacotherapeutics I courses. The shared learning experience was introduced during the second semester, when the third- and fourth-year students attended the Clinical Pharmacy II and Pharmacotherapeutics II hospital assignments together. The 138 students were divided into 20 smaller groups of 6 to 7 students, with each subgroup having 2 to 3 fourth-year students and 4 or 5 third-year students. After attending a didactic lecture for a specific topic or disease state, groups were assigned to hospital practice experiences and a patient with that disease state.

Based on course objectives and expected learning outcomes, third-year students were expected to assess the signs and symptoms of the patient's disease and interpret the results of relevant clinical laboratory tests. Fourth-year students were expected to identify actual and potential drug-related problems in the patient, prioritize the drug-related problems, and provide recommendations to resolve or prevent the identified problems using an evidence-based approach. To achieve these objectives, students were encouraged to apply their skills in communication and literature appraisal and to deliver relevant information for patient education and counseling to improve patient compliance with medication regimens.

As part of the assignment, students joined hospital preceptors for ward rounds and case discussions. A week after the practice experience, students were required to submit a hardcopy report on the patient's case using a format established by clinical faculty preceptors. They also presented the cases in the classroom for assessment by clinical faculty preceptors. Case reports and case presentations accounted for 20% of students' grades in Clinical Pharmacy II and Pharmacotherapeutics II.

EVALUATION AND ASSESSMENT

We designed and pretested a 23-item questionnaire to assess the value of shared learning during clinical assignments involving third- and fourth-year pharmacy students and to compare the perceptions held by the 2 student groups.

We developed the questionnaire based on our understanding of key issues related to the subject matter and how they interrelate with student perceptions. To ensure content and construct validity, the questionnaire was reviewed by 2 clinical pharmacy faculty members with experience and expertise in pharmacy education and curriculum design as well as survey research methodology. The questionnaire was modified according to the suggestions provided and sent for a second review. The reconciled and modified version was then pilot-tested among 20 pharmacy students from another university that used a similar teaching method. The respondents were able to understand and answer the items in the questionnaire. Based on responses from the pilot test, a reliability analysis of questionnaire items using Cronbach's alpha showed an internal consistency reliability of 0.69.

The questionnaire contained items designed to determine the respondents' demographic data (gender and year of study) and 3 domains to assess pharmacy students' general attitude and acceptance of the shared learning activity: method of teaching and course delivery (5 items); teamwork, communication, and clinical skills (10 items); and clinical faculty and hospital preceptors (8 items). A 5-point

rating scale (1 = strongly disagree to 5 = strongly agree) was used to generate response options for the 23 items. An open-ended question provided students an opportunity to offer suggestions for improving the shared-learning approach. Following the final practice experience, the survey instrument was distributed to all 138 students.

SPSS, version 16.0 (SPSS Inc, Chicago, IL), was used to analyze data generated by the survey. Descriptive and inferential statistics were used when appropriate, and frequencies and percentages were used to portray students' demographic characteristics and perceptions about the newly introduced clinical practice experience approach. Scores were computed as the mean of constituent items for easy comparison between the third- and fourth-year pharmacy students. *T* tests were used to compare variations in perceptions between the 2 student groups. Although the scale was ordinal, the parametric procedure applied was primarily intended to simplify understanding of the data analysis. Significance level was set *a priori* at $P < 0.05$. Thematic content analysis was used to analyze the qualitative data generated by the open-ended question with the aim of accurately identifying data patterns.

Pharmacy Students Perceptions of Shared Learning During Clinical Practice Experience

Of the 138 students involved in the clinical practice experiences (87 third-year and 51 fourth-year students), 98 returned usable questionnaires, for a response rate of 71.0%. Respondents were uniformly distributed by gender: 24 (51.1%) of third-year students were male and 23 (48.9%) were female; 27 (52.9%) of fourth-year students were male and 24 (47.1%) were female.

Table 1 presents the distribution of pharmacy student ratings of the shared learning strategy. Nearly 98% of respondents believed that the clinical pharmacy and therapeutics courses required the hospital assignment. A majority (59.2%) preferred weekly hospital assignments throughout the semester to daily assignments toward the end of the semester. While more than half of the respondents (55.1%) believed that they had acquired sufficient knowledge and skills from the hospital assignments during the semester, one third were neutral. A majority of the pharmacy students (57.7%) disagreed with the practice of being in the hospital and presenting cases on the same day, while only 23.7% preferred the same-day approach to presenting cases a week after the assignment. About 46% disagreed that one hospital assignment for each disease was sufficient exposure to achieve the required learning outcomes.

Some (16.3%) of the students noted that they were not comfortable working with another student group; however, a majority (> 75%) believed that, despite the differences in opinion during practice experiences, shared learning improved their ability to work as a team and gave them an opportunity to practice their communication and teamwork skills. Most respondents (> 70%) agreed that the shared learning experience would help them become effective members of the healthcare team and would facilitate professional relationships in future practice. Conversely, 31.6% of the students reported feeling that they could sufficiently learn clinical problem-solving skills by working only with peers from their own group.

Although nearly two-thirds of the students believed that shared learning enhanced or improved their ability to understand clinical problems, a smaller percentage (14.2%) did not support continuing the program and suggested that it be abolished.

Three-fourths (77.6%) of the participants reported that hospital preceptors were actively involved in case discussions with students, either via bedside teaching approach or in group discussions with students. More than 80% of respondents reported that both hospital-based and clinical faculty preceptors were helpful during the practice experience. A similar percentage who agreed that faculty preceptors facilitated the achievement of clinical practice experience objectives and encouraged active participation during case presentations indicated that they gained a great deal of clinical knowledge from working with preceptors.

We compared the evaluations of the 2 student groups to ascertain if there were significant variations in their perceptions and in how they rated the shared learning approach (Table 1). Although third-year students' scores were generally higher on most questionnaire items than were those of fourth-year students, the differences were mostly nonsignificant. Fourth-year students displayed a significantly higher preference for presenting a case on the same day of the practice experience than did their third-year counterparts (mean score of 2.8 [1.4] vs. 1.9 [1.1], respectively; $P < 0.001$).

Third-year students had significantly more positive attitudes toward both hospital-based and clinical faculty preceptors. There was a significant difference in mean scores for agreement that hospital preceptors were actively involved in case discussions (4.2 [0.8] for third-year students vs. 3.8 [0.9] for fourth-year students; $P = 0.013$). There was a similar result for agreement that hospital-based preceptors were helpful (4.4 [0.7] for third-year students vs. 4.0 [0.7] for fourth-year students; $P = 0.005$). Even though hospital preceptors spent equal time with all students, junior students might benefit from extra attention to catch up with case discussions and acquire clinical skills.

Table 1. Bachelor of Pharmacy Students' Insight on the Value of Shared Learning During Clinical Pharmacy Practice Experiences and Comparison of Third-Year and Fourth-Year Students' Perceptions

Survey Item	Degree of Response: Strongly Agree, N (%)	Agree, N (%)	Neutral, N (%)	Disagree, N (%)	Strongly Disagree, N (%)	Mean (SD): Year 3	Mean (SD): Year 4	*P*[a]
Course does not need hospital assignment	1 (1)	0	1 (1)	15 (15.3)	81 (82.7)	1.1 (0.4)	1.3 (0.7)	0.143
Prefer weekly hospital assignment	39 (39.8)	19 (19.4)	18 (18.4)	13 (13.3)	9 (9.2)	3.9 (1.3)	3.5 (1.4)	0.092
Acquired sufficient knowledge and skills	15 (15.3)	39 (39.8)	33 (33.7)	10 (10.2)	1 (1.0)	3.7 (0.9)	3.5 (0.9)	0.301
Prefer to present case on same day[b]	6 (6.2)	17 (17.5)	18 (18.6)	21 (21.6)	35 (36.1)	1.9 (1.1)	2.8 (1.4)	<0.001
One hospital assignment for each disease state is adequate	8 (8.2)	19 (19.4)	26 (26.5)	33 (33.7)	12 (12.2)	3.0 (1.2)	2.6 (1.1)	0.092
Not comfortable working with other batch of students	7 (7.1)	9 (9.2)	24 (24.5)	43 (43.9)	15 (15.3)	2.5 (1.1)	2.5 (1.0)	0.709
Difficult to find mutual agreement	4 (4.1)	14 (14.3)	30 (30.6)	37 (37.8)	13 (13.3)	2.6 (1.1)	2.6 (1.0)	0.897
Group learned to work as a team	32 (32.7)	43 (43.9)	20 (20.4)	3 (3.1)	0	4.2 (0.8)	4.0 (0.8)	0.203
Advantage to practice communication skills and teamwork	42 (42.9)	35 (35.7)	17 (17.3)	3 (3.1)	1 (1.0)	4.2 (0.9)	4.1 (0.9)	0.454
Help become a more effective member of healthcare team	42 (42.9)	28 (28.6)	20 (20.4)	5 (5.1)	3 (3.1)	4.2 (1.0)	3.9 (1.1)	0.212
Improve professional relationship in future practice	46 (46.9)	30 (30.6)	18 (18.4)	4 (4.1)	0	4.3 (0.9)	4.1 (0.9)	0.144
Improve communication skills and teamwork	23 (23.5)	43 (43.9)	30 (30.6)	2 (2.0)	0	3.9 (0.8)	3.8 (0.8)	0.560
Sufficient to learn with students from own batch	14 (14.3)	17 (17.3)	38 (38.8)	27 (27.6)	2 (2.0)	3.0 (1.0)	3.3 (1.0)	0.196
Increased ability to understand clinical problems	23 (23.5)	40 (40.8)	25 (25.5)	6 (6.1)	4 (4.1)	3.9 (1.0)	3.6 (1.0)	0.094
Suggest 'shared learning' approach be continued	36 (36.7)	23 (23.5)	25 (25.5)	7 (7.1)	7 (7.1)	3.7 (1.3)	3.8 (1.2)	0.568
Hospital preceptors identified and assigned suitable cases	14 (14.3)	40 (40.8)	28 (28.6)	14 (14.3)	2 (2.0)	3.6 (1.0)	3.5 (1.0)	0.534
Hospital preceptors actively involved in case discussions	28 (28.6)	48 (49.0)	16 (16.3)	4 (4.1)	2 (2.0)	4.2 (0.8)	3.8 (0.9)	0.013
Hospital preceptors were helpful	39 (39.8)	41 (41.8)	17 (17.3)	1 (1.0)	0	4.4 (0.7)	4.0 (0.7)	0.005
Learned much from hospital preceptors	34 (34.7)	48 (49.0)	14 (14.3)	2 (2.0)	0	4.2 (0.7)	4.1 (0.8)	0.367
Faculty preceptors helped in meeting aims and objectives	25 (25.5)	53 (54.1)	18 (18.4)	2 (2.0)	0	4.1 (0.8)	3.9 (0.7)	0.205
Faculty preceptors encouraged active participation during case presentation	24 (24.5)	55 (56.1)	17 (17.3)	2 (2.0)	0	4.2 90.7)	3.9 (0.7)	0.114
Faculty preceptors were helpful	32 (32.7)	49 (50.0)	17 (17.3)	0	0	4.3 (0.7)	4.0 (0.7)	0.022
Learned clinical knowledge from faculty preceptors	36 (36.7)	49 (50.0)	12 (12.2)	1 (1.0)	0	4.4 (0.7)	4.1 (0.6)	0.061

[a] Values were calculated from 5-point rating scale (1 = strongly disagree to 5 = strongly agree)

[b] One missing value

Pharmacy Students' General Comments

Students were asked to provide additional comments about and suggestions for improving the use of shared learning in the academic setting. Because responses were qualitative, the authors identified thematic categories based on students' responses. Three major themes emerged from the analysis.

Seventeen students (11 third-year and 6 fourth-year students) commented that the shared learning experience was generally beneficial to them; of these, 6 students (5 third-year and 1 fourth-year) felt that the system should be continued. One fourth-year student recommended the introduction of interprofessional shared learning with medical students in the future. Respondents also advocated for the introduction of the shared learning system to all levels of the BPharm program as well as in other related courses. One student from each group reported feeling that shared learning was more beneficial for junior students.

Seven students (4 third-year and 3 fourth-year) suggested that more hospital assignments and bedside teaching be added and that there should be a better balance between the 2 groups with respect to knowledge, performance, and personal attitudes. Eight students (7 third-year and 1 fourth-year) agreed that commitment and cooperation between the 2 groups were the major determinates of success in the shared learning approach.

DISCUSSION

The results of this study suggest that adopting shared learning would have a significant impact on the educational experience of students in clinical pharmacy and therapeutics practice experiences by improving their clinical knowledge as well as their communication and teamwork skills. Nearly two-thirds of the students agreed that shared learning in their clinical practice experiences enhanced their ability to understand clinical problems. Despite assumptions that fourth-year mentorship of third-year students would be more beneficial for the younger students, there was no significant difference between the 2 groups with respect to perception that the approach had increased their ability to understand clinical problems (3.91 [1.0] for third-year students vs. 3.57 [1.0] for fourth-year students, $P = 0.094$). Most pharmacy students in this study (>70%) agreed that shared learning provided an opportunity for improving their communication and teamwork skills and would help them become effective members of the healthcare team and facilitate professional relationships in future practice.

Our findings support a team approach to patient care and the importance of communication and collaboration with prescribers emphasized by the Center for the Advancement of Pharmaceutical Education (CAPE) 2004 Educational Outcomes and the Accreditation Council for Pharmacy Education (ACPE) in the United States.[6] They are also in line with an initiative by the Ministry of Higher Education (MoHE) of Malaysia to incorporate nonacademic skills (ie, communication and social skills, professionalism, values, and attitude) into the curriculum of pharmacy schools and colleges.[7,8] Based on our observations, along with the objectives of the faculty, the MoHE, and current pharmacy educational standards, shared learning would provide wholesome quality education to students and help produce graduates with academic excellence.

Although we took steps to achieve optimal implementation and execution of this approach in our study, there was a notable percentage (14.2%) of students who thought the shared learning experience should be discontinued. Furthermore, the respondents agreed that commitment and cooperation between the 2 student groups are among the main factors determining success of the shared learning approach. In future studies, peer-assessment could be used as one of the measures of student perceptions about their group members' commitment and cooperation. Several students felt that the new approach was more beneficial for junior students and suggested that there should be a better balance between group members with respect to knowledge, performance, and personal attitudes. Recognizing this as an issue, we formed balanced groups based on the students' examination results from previous clinical courses (Clinical Pharmacy I and Pharmacotherapeutics I) as well as our knowledge of their attitudes.

Despite concerns raised about the shared learning approach, it has received considerable support from and acceptance by students. The majority of pharmacy students surveyed felt that the hospital assignment component of the clinical pharmacy and therapeutics courses provided experiential learning and suggested that shared learning be continued in the future. They also commented on the need for more hospital assignment and bedside teaching and advocated incorporating the shared learning system in all levels of the BPharm program as well as other related courses. As an extension of this innovation, students recommended introducing interprofessional learning with medical students in the future. More than 80% of the students reported finding both hospital-based and clinical faculty preceptors helpful during their practice experiences and learning a great deal from them.

Clinical faculty members involved in this learning approach anticipated that it would help pharmacy schools improve patient care by producing effective members of the healthcare team. Pharmacy students in this study generally found the shared leaning approach beneficial in that it enhanced their ability to understand clinical problems, and improved their communication and teamwork skills.

The findings of the present study highlight strengths as well as potential weaknesses of the shared learning approach in pharmacy education. Future studies should focus on creating more structured and effective shared learning methodology with greater emphasis on assessing the potential impact of this educational approach. The findings of this study have important implications for pharmacy students' teaching and learning, but further investigation is needed to determine its impact on clinical faculty members.

Limitations

Results of the current study should be interpreted in the light of some major limitations. The study did not measure the level of clinical knowledge and skills of the students before and after implementation of the shared-learning approach. Thus, we did not have data to accurately compare the students' level of knowledge, skills, and perceptions and to determine the potential impact of the shared-learning approach in improving students' communication, teamwork, and clinical skills. Future studies should assess the clinical knowledge and communication skills of the participating students before and after the shared learning experience.

Another limitation of the study was that it did not generate data necessary to measure the extent of each student's involvement and contribution in the subgroups. At present, there are no clear guidelines on how to evaluate pharmacy students' level of soft skills (eg, communication and teamwork). The validity and reliability testing of the questionnaire conducted with 20 pharmacy students was preliminary. For future studies, the psychometric properties of the pre-piloted questionnaire used in this study should be determined to assess its validity and reliability completely. The low questionnaire return rate among third-year students (47 of 87: 54%) vs. fourth-year students (51 of 51: 100%) might be a potential source of nonresponse bias. The results comparing perceptions of both groups of students (Table 1) could be notably affected by limitation.

SUMMARY

The implementation of shared learning during clinical pharmacy practice experience of third-year and fourth-year undergraduate pharmacy students has enhanced their ability to understand clinical problems, and improved their communication and teamwork skills. Both groups of students were positive that they had acquired some skills through the shared learning approach. This approach would help pharmacy schools provide wholesome quality education to students and produce graduates who become effective members of the healthcare team and improve patient care.

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