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IMPACT OF DRUG INFORMATION ADVANCED PHARMACY PRACTICE EXPERIENCE ROTATION ON DOCTOR OF PHARMACY DEGREE STUDENTS'SKILLS, TAIF, SAUDI ARABIA

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ABSTRACT

Objectives: The study aims to evaluate the advanced pharmacy practice experience clerkship of drug information among doctor of pharmacy degree (Pharm D) students, before and after the rotation, and to assess the impact of the training on improving students 'skills. **Methods:** The study was pre-and-after study, in which two self-administered questionnaires were given in the start and the end of the rotation, to the students. The same questionnaire core items were given also to the preceptor. Convenient sample was chosen from2015/2016(13/50), and 2016/2017 (43/54) academic sessions. Descriptive statistics and Paired T-test were used. **Results:** The two most important desired and learned skills were correct use of drug information resources (30.56% desired, 26.17 learned), effective use of references (15.74% desired, 15.89% learned), critical appraisal (12.04% desired, 14.95% learned). Most students showed higher means of the results at the end of the rotation: ability to accept criticism and advice (4.64), attending activities and accomplishing duties on time (4.57), can work independently (4.55), important and active member (4.48) ability to make decisions (4.46), and ability to use resources (4.46) Students 'ratings for themselves were higher than the preceptor in all the activities. **Conclusion:** The study showed obvious improvement in skills of drug information skills among the final year Pharm D students. There is overestimation in the students 'results when compared with the Preceptor evaluation. Students should be oriented about the objectives of the clerkship and, the training course should always be revised according to the feedback from the students and preceptor's assessments. Students' pre-assessment is important in discovering the weakest points in the required skills.

KEYWORDS: Self-assessment; assessment; advanced pharmacy practice experience; drug information.

INTRODUCTION

Drug information skills are considered as one of the important competencies needed for the clinical pharmacist. In USA the first drug information center was opened at the University of Kentucky medical center in 1962.[1] A survey made in 1973 revealed opening of more 54 centers in the United States, which followed Kentucky center.[2] The new clinical role of the pharmacist is essentially dependent on the pharmacist capability in retrieving the correct pharmacotherapy information, and interacting with different consultations. Regardless of which experiential rotation the pharmacist will enter, it is a common feature for all pharmacy students to provide drug information as part of their patient care and non-patient care activities.[3] Drug information skills not only involve answering specific drug therapy–related questions but also broader medication use policy issues such as formulary management, pharmacoeconomics, adverse events and medication error identification and reporting, and assessment and use of systematic reviews.[4] Faculty of pharmacy in Taif University, Saudi Arabia was established in 2005.,and it offers Pharm D program. In the final sixth year there is nine clinical rotations eight of them were mandatory and one is elective. Drug information is mandatory required advanced pharmacy practice experience rotation, and for three credit hours.[5] The didactic course of the drug information was taught in Taif college of pharmacy as an integrated course with introduction to pharmacy practice. This course is provided in the third year. In United states 70% of pharmacy schools offer the course as a required and standalone course, while in 30% of schools the course was either integrated or taught throughout the program. The experiential course is required in 23% of the schools, and elective in 62%.[6]

MATERIALS AND METHODS

Design

The duration of the clerkship is 4-weeks, and it is a mandatory course. The students must pass all the previous courses. The clerkship was done in the Drug Information center in the college, which is a part of the main library. This center is only for training purposes. The students will be distributed by the training committee, and the capacity for each month is 5-15 students for each month. Some students will start with this clerkship, and others will come after finishing other clinical rotations in hospitals.

Intervention

The activities required from students are summarized in Table-1.The first week include: orientation and tertiary resources, the second week: secondary and primary resources and general assignments, the third week: drug monograph preparation and pharmacotherapy cases, and the fourth week: journal club presentations. The reference used by the students in this rotation is that of Malone.[7]

Table 1: Drug information training activities.

Activity	Number
Summarize 20 tertiary specialized references	5/day, first week
Assignments	1/day, second week
Preparation of drug monograph	One for each student (third week)
Problem-based pharmacotherapy cases & drug information consultations	1/day, third week
Critical appraisal and journal club presentation.	One study for each student (fourth week)

Data collection

A survey instrument was adapted from literature,[8] and from objectives of the course. The survey is given in the first and the last day of the rotation, and this was piloted among 10 students. The questionnaire consisted of 21 items, and in the end of the questionnaire each student was requested to nominate two desired skills (in the first day), and two learned skills (in the last day). The same questionnaire (21items) was given for perceptor' evaluation (for randomly selected 12 students) the questionnaire covered different domains which are: use of resources, critical evaluation, communication and other.

The questionnaire is using Likert scale grading of 1-5 (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree).

Statistical analysis

The results of the survey were coded and entered in Excel for revision, then entered to SPSS version 21.

Descriptive statistics (percentages/frequencies) were used. Comparisons of responses of students pre-and-after the rotation, and preceptor' evaluation versus students assessment, were done using paired student T-test.

This research is approved by the ethical committee in the college.

RESULTS

Fifty six students responded to the survey (26%, 13/50) students from session2015/2016, and, (80%, 43/54) from session2016/2017). Table -2 summarizes the two most important desired and learned skills. Generally the highest responses of the desired skills (58.34%) correspond with the results of the learned ones (57.01%). These are: Correct use of drug information resources (30.56% desired, 26.17% learned), Effective use of resources to answer questions (15.74% desired, 15.89% learned), and Critical appraisal of clinical studies in field of pharmacotherapy (12.04% desired, 14.95% learned). Those skills which are desired but not learned were actually embedded within other learned ones, examples are: Use clear and correct language, and ability to reply orally to drug information requests. Communication skills were less desired and less learned (0.93% to 7.41%).

Table 2: The students' two most important desired and learned skills in drug information rotation.

Skill	(%/No)¦Desired,	Learned, (%/No)¦¦
Resource use Correct use of drug information resources	30.56(33)	26.17(28)
Ability to use different resources	5.55(6)	8.41(9)
Improved database searching (e.g. Medline)	3.70(4)	7.48(8)
Effective use of resources to answer questions	15.74(17)	15.89(17)
Ability to use and integrate new and advanced information	3.70(4)	0.93(1)
Critical evaluation To know types of clinical studies, their designs, weakness and strength	2.78(3)	0.93(1)
Critical appraisal of clinical studies in field of pharmacotherapy	12.04(13)	14.95(16)
Ability to evaluate internet sites	2.78(3)	2.78(3)
Communication Use clear and correct language	3.70(4)	NR
Proper documentation of drug information responses and the search strategies utilized	0.93(1)	1.87(2)
Prepare written replies skillfully	2.78(3)	1.87(2)
To be organized, and can retrieve and give information smoothly	7.41(8)	6.54(7)
Proper and correct writing	0.93(1)	0.93(1)
Ability for presenting data orally with proper information and references	0.93(1)	0.93(1)
Ability to reply orally to drug information requests	2.78(3)	NR
Other Effective time management and ability to do many assignments at a time	NR	1.87(2)
Can work independently to get the required information	NR	1.87(2)
To be important and essential team member	1.85(2)	0.93(1)
Ability of making decisions and have the initiative to work independently	1.85(2)	0.93(1)

*% based on total responses (Number of responses)
¦ Desired= total number of responses: 108 .
¦¦ Learned= total number of responses: 102 responses (some students listed 1 or two similar skills).
NR=not reported.

Table-3 displayed the responses before and after commencement of the rotation. There is a significant differences between these responses (P 0.001). Most of the students 'responses showed higher means in the end of the rotation compared to the beginning The highest of them is: ability to accept criticism and advice(4.64), attending all activities and accomplish duties on time(4.57), can work independently to get the required information (4.55), to be important and active member in the team(4.48), ability of making decisions and have the initiative to work independently (4.46), and ability to use different resources(4.46).The means of the weakest ratings at the beginning considerably increased at the end: Critical appraisal of clinical studies in field of pharmacotherapy(increased from 2.45 to 3.82), to know types of clinical studies, their designs, weakness and strength(increased from 2.46 to3.84), Ability to use new and sophisticated information(increased from 2.64 to 4.18), proper documentation of drug information requests(increased from 2.75 to 3.96), and ability to evaluate internet sites (from2.80 to 3.93).

Table 3: Students' self-assessment pre and after drug information rotation.

Activity	Beginning of rotation(mean/SD*)	End of rotation(mean/SD*)
Correct use of drug information resources	3.21(0.75)	4.39(0.59)
Ability to use different resources	3.34(1.29)	4.46(0.71)
(Improved database searching(e.g. Medline/PubMed)	3.30(0.96)	4.41(076)
Effective use of resources to answer questions	3.18(1.01)	4.32(0.83)
Ability to use new and sophisticated information	2.64(.86)	4.18(0.72)
Proper documentation of drug information requests	2.75(0.99)	3.96(0.91)
Ability to write information in organized manner and without spelling mistakes	3.00(1.16)	3.80(0.92)
Ability to evaluate internet sites	2.80(1.22)	3.93(0.85)
To know types of clinical studies, their designs, weakness and strength	2.46(1.00)	3.84(0.97)
Critical appraisal of clinical studies in field of pharmacotherapy	2.45(1.14)	3.82(0.96)
To be important and active member in the team	3.77(0.99)	4.48(0.60)
Ability for presenting data orally with proper information and references	3.02(1.07)	4.29(0.82)
Communicate with proper language	3.41(1.11)	4.11(0.82)
Prepare written replies skillfully	3.11(1.07)	4.07(0.95)
Ability to reply orally to drug information requests	3.16(1.09)	3.96(0.99)
To attend all activities and accomplish duties on time	4.48(0.81)	4.57(0.71)
Ability of making decisions and have the initiative to work independently	3.93(0.95)	4.46(0.76)
To be organized, and can retrieve and give information smoothly	3.66(0.98)	4.30(0.78)
Effective time management and ability to do many assignments at a time	3.70(1.23)	4.32(.90)
Can work independently to get the required information	3.77(0.91)	4.55(0.66)
Ability to accept criticism and advice	4.52(0.76)	4.64(0.62)

*SD=Standard Deviation.

A comparison of the students ' self-assessment and preceptor was made for twelve randomly chosen students from all the sessions. This is illustrated in Table 4.There is an overall significant difference between both results (P 0.001). Generally all Students ratings for themselves were higher than those of the preceptor. There is no significant difference in only 4 items of the 21 points of the questionnaire which include: Proper documentation of drug information requests (P 0.49), ability to write information in organized manner and without spelling mistakes (P 0.19), ability to reply orally to drug information requests (P 0.175), and ability to accept criticism and advice (P 0.275), nevertheless the preceptor evaluations were still higher than those of the students.

Table 4: Comparison of mean responses of student' self-assessment and perceptor' evaluation (for 12 students).

Activity	Student 'evaluation	Preceptor' evaluation	P value
Correct use of drug information resources	4.25(062)	3.58(0.79)	0.02
Ability to use different resources	4.42(0.67)	2.83(0.83)	0.001
(Improved database searching (e. g Medline/Pubmed)	4.58(0.67)	3.25(0.96)	0.001
Effective use of resources to answer questions	4.25(0.62)	3.25(0.62)	0.001
Ability to use new and sophisticated information	4.17(0.58)	2.25(1.21)	0.001
Proper documentation of drug information requests	3.58(0.67)	3.33(0.980	0.49
Ability to write information in organized manner and without spelling mistakes	3.67(.89)	3.08(1.16)	0.19
Ability to evaluate internet sites	4.00(0.74)	1.92(0.90)	0.001
To know types of clinical studies, their designs, weakness and strength	4.00(0.60)	2.66(0.88)	0.001
Critical appraisal of clinical studies in field of pharmacotherapy	3.92(0.79)	2.25(1.21)	0.001
To be important and active member in the team	4.58(0.51)	3.17(1.33)	0.004
Ability for presenting data orally with proper information and references	4.25(0.62)	3.58(0.90)	0.013
Communicate with proper language	4.17(0.72)	3.42(.99)	0.043
Prepare written replies skillfully	3.83(0.83)	3.00(0.95)	0.034
Ability to reply orally to drug information requests	3.83(0.72)	3.42(0.67)	0.175
To attend all activities and accomplish duties on time	4.58(0.67)	3.08(1.24)	0.002
Ability of making decisions and have the initiative to work independently	4.42(0.51)	3.17(1.47)	0.011
To be organized, and can retrieve and give information smoothly	4.25(0.75)	3.50(1.09)	0.032
Effective time management and ability to do many assignments at a time	4.33(0.78)	3.25(0.85)	0.002
Can work independently to get the required information	4.50(0.67)	3.25(1.14)	0.001
Ability to accept criticism and advice	4.25(0.75)	4.00(0.00)	0.275

DISCUSSION

The use of self-assessment for students is considered as an important method to reveal the weakness in certain skills, and to measure the improvement throughout the academic courses. This especially obvious when measured before and after an academic course Harris et al,[9] used pre and after test, to evaluate improvement in core knowledge after giving online modules of ambulatory care advanced pharmacy practice experience, and they discovered that the pre-test will identify weakness and leads to focused interventions based on deficient areas. The current results showed that the baseline rating for the desired skills is high, and therefore a narrow margin of difference was shown when compared with the learned ones. Generally the students also gave high ratings at the end of the rotation compared to the beginning, for all the activities, showing improvement in their drug information skills. When a sample of the students was evaluated through preceptor assessment, a variation was found, in which preceptor rating was lower than the students 'rating.

The basic scores of the students for the desired skills approximates those of the learned ones (Table2).This could be explained by the fact that the students already came across this information in the didactic courses, and they were oriented ,to some extent, about their contents; or due to the high confidence, among the students, which could lead to overestimation. This overestimation is recorded in studies among medical students.[10,11] The main desired and learned skills were related to how to use resources and critical appraisal, which comprises more than half of the responses. This is similar to the results of study from USA, in which the almost 50% of the responses were for increased knowledge of resources, where to find information and improved data-base searching.[8] Communication ratings, as desired skills, were less and this may be due to the influence of the use of the students to the didactic theoretical style of the previously taught drug information course, limiting their expectations of these practical skills. Responses of the students at the beginning (Table3) showed a weakness in critical evaluation of internet sites and clinical studies, documentation and use of sophisticated and new information, and this could be explained by the fact that this topics were not covered deeply in the theoretical course, especially the critical appraisal. In the clerkship period students have detailed use and application of clinical pharmacy other aphetic studies, and have many tutorials in how to evaluate and present studies in journal club sessions. These sessions consisted of statistics interpretations and correlation of results. Ability to accept constructive criticism was rated the highest (4. 64±), and this also similar to the results in the previously mentioned USA study.

Preceptor 'evaluations for students showed lower results, than expected, with significant difference in 17 of the 21 items of the questionnaire The weakest ratings were for critical evaluation of sites and studies and the use for sophisticated information, this actually the same weakest skills denoted by the students at the beginning of the rotation. This necessitates giving more attention for student's self-assessment at the beginning of each rotation to lead the direction towards focused training. This poor agreement between preceptor or faculty assessment and students' assessment is also found in

other studies among medical students.[12,13,14] Students should always be oriented about the self-assessment points and how to use it to record their performance and they should always give the true situation in a realistic grading. In results from three meta-analyses,[15] regarding medical students' self-assessment of performance, the author noticed that faculty or students preceptors may give a harsh evaluation for performance ,than students expect, and this could be due to the fact that students may not know which behaviors are important for success. This calls for the need for more explanation for performance criteria to students.

LIMITATIONS

These studies have some limitations. Because it is the first study of its type in the college, there were no previous reports to compare with. Preceptor 'assessment of the students was made for a sample of twelve and not all the sessions, and this could affect the generalization to the whole class A convenient sample was used.

CONCLUSION

This study revealed improvement in skills of drug information advanced pharmacy experience clerkship, among the final year Pharm D students. Perceptor' evaluation showed the need of giving importance to the orientation of the students about the objectives of the assessment, to avoid overestimation, and to narrow the variation between students and preceptors 'evaluation. A continuous revision for the training course should always be made according to the feedback from the students and preceptors assessments. Pre-rotation assessment is important in discovering the weakest skills which should be supported.

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