Student perceptions regarding a learner-centered pharmaceutical care course

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ABSTRACT

The pharmaceutical education has been changed by incorporating of new teaching methods. In this sense, assessment of students' perceptions about these teaching methods is essential for achieving the goal of providing students with the competences to pharmacy practice. Thus, the present study aimed to evaluate pharmacy students' perceptions of a pharmaceutical care course implementing learner-centered teaching. A pharmaceutical care course, using active learning methods, was introduced at the Federal University of Sergipe. Feedback concerning the students' experiences with the newly developed course and information about their preferences regarding the learner-centered approach were collected. The resulting data were analyzed using a quali-quantitative approach. In their evaluations of the course, most of the students (94.6%) indicated that they thought the lessons of the pharmaceutical care course had relevance for their professional/personal development. Furthermore, they indicated that the use of techniques such as role-play had helped to motivate their learning. The vast majority of the students reacted positively to the innovative course. They perceived the use of learner-centered methods as providing an appropriate environment for allowing students to demonstrate their pharmaceutical care competencies. The students' responses also pointed to potential ways to improve the curriculum of the course.

Keywords: Active Learning, Competences, Pharmacy Students, Pharmaceutical Care, Student Perceptions.

INTRODUCTION

In recent decades, the high prevalence of morbidity and mortality by use of drugs has constituted a serious public health problem. In response to this social need, the pharmacy profession has experienced a fundamental change in its philosophy of practice, namely pharmacists have changed the focus of its shares of preparing medications for patient-centered care [1]. In this sense, has emerged in 1990 the Pharmaceutical Care that was conceptualized as "the responsible provision of drug therapy for the purpose of achieving defined outcomes that improve a patient's quality of life". These outcomes are (1) cure of a disease, (2) elimination or reduction of a patient's symptomatology, (3) arresting or slowing of a disease process, or (4) preventing a disease or symptomatology [2]. Although the concept of pharmaceutical care has been disseminated worldwide since its emergence, the research literature shows that the ideals of pharmaceutical care have not yet been achieved, and, furthermore, that, the high incidence of drug-related problems (DRP) is associated with a lack of competence among pharmacists for performing this service [3-8].

In order to improve this scenario, pharmacy educators must educate future pharmacists so they will be equipped with the knowledge, skills, and attitudes required for practicing pharmaceutical care [9]. According to Troncon, the acquisition of proficiency in clinical skills depends on proper learning and especially on repeated practice, or rather reiterated practice [10]. Therefore, in order to prepare pharmacy students to act as pharmacist caregivers, it is necessary for pharmacy education programs to encourage students to acquire experience in patient care, and to encourage teachers to adopt advanced teaching methods that encourage dialog, while working to construct an educational culture which will enable students to gain experience in patient care [11,12,13]. The

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American College of Clinical Pharmacy (ACCP) White Paper made several predictions and recommendations regarding pharmacy's future. These predictions place increased emphasis on the patient and on patient care [5]. The report suggests that pharmacy educators need to prepare students for solving problems, critical thinking, making ethical decisions, interpersonal communication and self-directed learning, recognizing that using active learning strategies can be a valid way to facilitate the training of pharmacists for the practice of pharmaceutical care [5, 14].

Active learning is an educational approach that entails having students participate actively in the learning process, and share responsibility for own learning [15, 16]. It proposes that learning situations be designed to promote reality-based critical thinking, and encourages teachers to pose challenging questions that will generate curiosity among students. Students should be provided with the resources needed for researching problems and solutions; they should be encouraged to propose hypothetical solutions to problems, and to organize and compare, and possibly apply, the proposed solutions. While the faculty member(s) should provide the students with some guidance regarding ethical dilemmas or discrepancies, they must also challenge the students to continue learning [17-20]. This approach has been widely implemented in pharmacy education in order to allow students to become actively engaged in the learning process and develop their critical-thinking skills [21].

The use of active learning methodology has many potential benefits, including helping students to develop learning autonomy. Problem based learning, case studies and simulations are some of techniques that may be employed [22-24]. An inseparable part of the learning process in active learning, is course evaluation. According to Hutchinson (2003), the educational climate/ environment, as perceived by students and teachers, plays a very important role in supporting student learning, which can also be affected by learners' previous experiences and preferred learning styles [25]. Many universities use a cooperative approach in assessing students' needs and their perceptions of the learning environment, recognizing that students are the main stakeholders in their own education [26-28].

Although a number of studies have been conducted on learner-centered teaching, few studies have examined students' perceptions about the impact of this technique of teaching method. Furthermore, a systematic review of the literature, conducted by the authors with the purpose of analyzing published studies on the teaching of pharmaceutical care,

found no studies of the use of active learning for pharmaceutical care education in Brazil that is the reason for the need of study like this. The objective of the present study was to fill this research gap by analyzing students' perception on a newly developed pharmaceutical care course.

METHODS

Course Design: Pharmaceutical Care is a required 4-credit course in the five years Undergraduate Pharmacy Program of the Federal University of Sergipe in São Cristovão, Brazil. The general objectives of the course include obtaining an understanding of the pharmaceutical care philosophy and developing the competencies necessary for practicing pharmaceutical care. The Pharmaceutical Care course was redesigned in 2013, by one teacher and two other course developers, with the objective of making it more learner-centered. The teacher had a PhD in Pharmaceutical Care, and ten years of experience in teaching and practice; the two developers were PhD students in Pharmacy, one of them having been a hospital pharmacist for two years and the teacher of a pharmaceutical services course for one year while the other had been a community pharmacist for three years and a preceptor in a pharmaceutical care clerkship.

Before and during the pharmaceutical care course, the three developers held meetings to share ideas about the needs, objectives, teaching strategies, and content of the course. Furthermore, before this study was begun, a focus group of expert teachers was convened to support the development of the syllabus of the course. The focus group aimed to: (1) identify the competencies that are necessary for the practice of pharmaceutical care; and (2) develop specific learning activities and teaching methods that would foster these competencies.

The Pharmaceutical Care model embraced by this course was based on the Strand and Hepler philosophy of the processes of care (Hepler and Strand, 1990). Briefly, the students in the course were expected to assess their patients' drug-related needs and manage those needs through appropriate interventions, including education, monitoring, and follow-up care. The students were required to participate in a variety of direct and non-direct patient care activities that would give them the opportunity to take on such responsibilities.

Teaching methods used: Based on the new course goal of the course and the views expressed by the focus group, the content of the pharmaceutical care course and the learning strategies to be used in it

were defined. Table 1 summarizes these aspects of the pharmaceutical care course.

Participants: All of the students who were enrolled in the pharmaceutical care course of the Undergraduate Pharmacy Program of campus of São Cristovão of the Federal University of Sergipe, in the first semester of 2013 were asked to participate in the study. The students were advised of the goals of the study and the fact that the collected data would be confidential. Information on the participants' age, gender, and year in the Undergraduate Pharmacy Program was collected. Only students who did not consent to participate were excluded from the study.

Evaluation: A student opinion survey was conducted in the final week of the semester. Both qualitative and quantitative methods were used to obtain feedback from students regarding their experiences in the pharmaceutical care course.

The students were asked to complete two questionnaires (Questionnaire I and Questionnaire II) that covered general student information and also included questions requiring them to select answers from a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The instruments used in the study were developed by the authors, based on the related literature [29-32]. Questionnaire I asked the students to assess general aspects of the course, including whether the teacher had been able to provide them with the intended types of experience, and their own performance in the course. Questionnaire II asked the students to evaluate the content of the course (i.e., its relevance to practice) as well as how the content was delivered, including the teaching method and whether it was a stimulus to learning. The students were also asked whether they preferred that courses be taught using active learning methods. This topic was covered by two dichotomous (yes or no) questions.

At the end of the survey the students were asked to say what they liked the most and liked the least, about their pharmaceutical care course experience. The students' responses to these questions were then subjected to a qualitative content analysis according to the steps suggested by Bardin (2006): pre-analysis, exploration of materials, and processing and interpretation of results [33].

Data analysis and ethical aspects: Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS)®, version 17. Descriptive statistics were calculated for the questionnaire items from both a continuous (mean and SD) and a categorical (percentage in agreement or disagreement) standpoint. The Shapiro-Wilk test of normality was also applied to the data, which were not found to be normally distributed. Thus, the Kruskal-Wallis test was used to examine differences among the students' perceptions regarding the teaching methods used. All of the responses were anonymous. The study was approved by the Human Research Ethics Committee of the Federal University of Sergipe.

RESULTS

Of the 41 students enrolled in the pharmaceutical care course, 37 (90.2%) completed Questionnaire I, and 34 (82.9%) completed Questionnaire II. Of the 37 who completed Questionnaire I, 28 were female (75.6%), the median age was 23.6 (SD 2.7) years, and most of the students (n = 31) was in the fourth year of the Undergraduate Pharmacy Program.

The results from the student surveys are summarized in Tables 2 and 3. Table 2 presents the results of the students' assessments of the pharmaceutical care course and its teacher as well as their self-assessments. In their evaluations of the course, 94.6% of the 37 students who completed Questionnaire I indicated strong agreement or agreement that "the lessons had relevance for my professional/personal development." A similar percentage of students (91.9%) strongly agreed or agreed that "the lessons encouraged student discussions in the classroom." Furthermore, 89.1% of students strongly agreed or agreed that "during the course, students were provided with opportunities to demonstrate their knowledge." However, 48.6% of students disagreed or strongly disagreed that "the facilities used for the lessons were appropriate."

When the students were asked to evaluate their teacher (Table 2), 90.9% strongly agreed or agreed that the teachers had presented the content of the lessons clearly, and 89.2% said they had encouraged them to participate in discussion. However, the students' responses to the question about whether the teachers had helped them understand how their performance in the course activities would be evaluated, were more negative, with 43.3% of students disagreeing or neither agreeing nor disagreeing. With regard to the students' self-assessments, 97.3% of the students strongly agreed or agreed that they had been able to learn the course content, and 86.5% strongly agreed or agreed that they were motivated to learn more. Additionally, no student reported having had difficulties with searching for the information about diseases or medications that they needed for caring for their patients. (Table 2)

With regard to the students' assessments of the content of the Pharmaceutical Care course, and of the teaching method used in it (Table 3), there were variations in the numbers of students (ranging from 21–34 students) who evaluated each part of the content. This occurred because some of the students had been absent from some of the lessons. The students evaluated each part of the content with regard to its relevance to pharmaceutical care practice. The "drug administration" part of the course content had the highest score (mean 4.7 ± 0.4). With regard to the evaluations of the appropriateness of the teaching methods used for lessons for the content of the lessons, the "Measurement of clinical parameters," and "Review of pharmacotherapy and implementing pharmaceutical care service" lessons received the highest scores. These two lessons also received higher scores with regard to being "interesting and stimulating."

The students were also asked if the teaching methods used in particular lessons helped to motivate learning. The lesson "Measurement of clinical parameters" lesson, which was taught using role play, received the highest score in this area (mean 4.5 ± 0.6). However, when the Kruskal-Wallis test was applied, the lessons' scores were not found to differ significantly from each other (Table 3). Further feedback from the students with regard to the lessons, "Drug-related morbidity and mortality," "Pharmaceutical care: historical and conceptual aspects," "Drug administration," and "Invitation to use pharmaceutical care service" indicated that they could have been more dynamic. It is noteworthy that 97.3% of students indicated that they preferred that pharmaceutical care courses be taught using active learning methods.

The students' comments about the things they liked the most and liked the least about the pharmaceutical care course are summarized in Table 4. These comments were grouped into themes. The most positive comments generally referred to the lessons, the relationships developed in the classroom, the relationship between the course and professional pharmaceutical practice, and the teaching methodologies used in the course. The more negative comments generally referred to the structures of the lessons, the assessment methods, and the lack of extended student contact with real patients. Table 4 also presents themes regarding the areas that the students said could be improved for future pharmaceutical care courses. A major theme was the need for more contact with real world patients.

DISCUSSION

This study aimed to design a course that would ensure that student pharmacists would develop the knowledge, skills, and attitudes required for pharmaceutical care practice. According to the literature, preparing pharmacy students for practice in the modern healthcare system requires rethinking teaching methodologies, going beyond the traditional lecture-based methods of delivery of factual material, and incorporating methods that allow students to practice effective problem solving in the classroom [34]. Hudgens and Chirico affirmed that incorporating active-learning strategies into a course can help to ensure that students apply the information that they learn [9]. Furthermore, it has been shown that these strategies are equivalent to traditional lectures with regard to the learning of content, but that active learning methods are superior from the standpoint of promoting thinking skills [9,20].

The designed educational intervention was positively evaluated by the pharmacy students. Several studies have shown that incorporating active learning methods into pharmaceutical care courses can produce positive results [31,35,36]. A study conducted by Winslade showed that students prefer active learning methods over the traditional model [35]. Kassam conducted a study that aimed to understand students' perceptions regarding a newly developed pharmaceutical care course [31]. It was found that a high proportion of the students (80%) believed that the course had helped them to develop professional maturity and responsibility. Harpe and Phipps conducted a similar study where students' perceptions about a course were evaluated, which found that the students felt that their stress levels had been reduced in the course, and that they felt they had been able to take more control of their learning environment, and had multiple opportunities to demonstrate their learning [36].

The positive findings of the present study regarding the incorporation of active learning methods are consistent with those of Becker, which evaluated the learning styles of students in the Undergraduate Pharmacy Program of the Federal University of Sergipe [37]. Learning styles are defined as "the ways in which individuals characteristically approach different learning tasks" and as "particular sets of behaviors and attitudes related to learning context" [38,39]. The literature suggests that knowledge about the learning styles and strategies of students is relevant for teachers and educational managers who are involved in the design and selection of teaching situations for the classroom, if they wish to maximize the

effectiveness of the teaching and learning processes [37,40]. It is also recommended that educators provide a range of learning opportunities reflecting students' learning preferences [41].

In the Becker study, the learning styles of the students were classified according to the Index of Learning Styles (ILS). It was observed that most pharmacy students fall into the categories of Active Learners (who achieve better retention and understanding when they participate actively in activities); Sensory Learners (who like practical work and do not like courses that have no connection with reality); Visual Learners (who better remember things they have seen, and prefer representations using movies and demonstrations) and Sequential Learners (who follow logical and gradual pathways in solving problems) [37]. These characteristics can explain the positive reactions of pharmacy students to the learning methodologies used in this pharmaceutical care course. Moreover, the variety of teaching methods used in the course provided opportunities for many of the students to experience their preferred forms of learning, perhaps helping to lead to the high scores in the course evaluations. Similar results were observed in Braclay et al., which utilized several active learning methodologies and found that, regardless of the students' learning preferences, the incorporation of these innovative active-learning tools enhanced their learning experiences in the course [42].

In our study most of the students said that in the practical lessons on measuring clinical parameters, where role-play methods were used, the methods used helped to motivate learning. This result was consistent with those of the qualitative data analysis. The literature shows that role-play can be used to develop patient-centered approaches to problem solving, improve oral communication skills, and build confidence in using newly acquired information in encounters with real patients [43]. Radomski and Russell found that students who participate in integrated case learning (i.e., lessons using a combination of role-play and reflective group analysis) commented that it helped to create a connective bridge between the classroom and the clinical setting [44]. Moreover, Crawford et al. observed that students preferred to work in small groups, enhancing their learning experience by collaborating with classmates, sharing ideas on how to solve problems with patient cases, and that this small group work helped to prepare the students for communicating with other healthcare professionals [45].

In this study, a majority of the students said that a positive aspect of the course was the practical experience it offered. According to the literature, practical experience has a positive impact on pharmacy education, facilitating early professional socialization. It enables students to develop professional attitudes and skills, providing them with timely clinical exposure as the profession becomes more patient-focused [46]. It is noteworthy that, in the current study, before having direct contact with patients and experience in pharmaceutical care, the students attended lessons focusing on the basic knowledge needed for patient care, including how to assess clinical parameters, and to search information sources, and the basics of medication use. Accord to Winslade, students should receive general instruction on the background and principles of pharmaceutical care prior to becoming involved in therapeutics [35].

However, a number of the students' negative comments on the course referred to the small number of classes that involved real patients. Kassam observed the same difficulty. In the present study, as it was difficult to find patients who were interested in participating in the course's activities, some of the preceptors remarked that they would have liked to have the option of pre-assigning questions to the students in connection with lessons involving simulated patients to enable them to practice their pharmaceutical care skills and knowledge without having to find actual patients [31].

The participants in the study evaluated the teachers of their lessons. According to the literature, good teachers encourage contact between students and faculty, work to develop reciprocity and cooperation among students, encourage active learning, give prompt feedback, emphasize time on task, communicate high expectations, and respect diverse talents and ways of learning [47,48]. However, given the changing climate of accountability in higher education, it is no longer sufficient to say that someone is a "good teacher"; instead, mechanisms must be available in education that can help to promote real change and growth in the teaching skills of faculty, and that capture the reality of the classroom [34].

In the present study, students who were used to having traditional learning classes were subjected to new, dynamic teaching methods, in order to improve their knowledge and skills using active-learning tools. The students demonstrated that they could well accept those methods, and about 50% of them said that would like to have contact with real world patients in future courses related on pharmaceutical care; these findings are in agreement with those of Harpe and Phipps, who reported that some students did not easily accept

the learner-centered methods used in a course [36]. These authors also mentioned that at the beginning of the semester some students appeared to be confused by the new learning techniques, but that this confusion disappeared during the course as the students developed greater self-confidence and began to suggest ideas for improving the course [36].

With regard evaluations of the preceptors, the use of the active learning methods provoked a very significant change in the global effectiveness of teaching in the course. About 90.0% of the participants reported that they were satisfied with the clarity of the lectures and had been encouraged to acquire new knowledge in the field of pharmaceutical care. This is in consistent with the findings of Cox et al. and Kuzmanovic et al., who emphasized that evaluation of preceptors by students could help to improve future courses [49,50]. Kidd and Latif attributed the strength of this evaluation method to the fact that long-term contact between students and preceptors over the course of a semester puts the students in a good position for assigning scores [51].

According to Persky, a course review process should identify areas needing improvement [52]. This process should focus on foundational aspects of teaching, learning, and assessment, such as the selection of appropriate learning objectives; degree of learning-centered activities; assessment methods consistent with the learning objectives; and course goals. In this sense, the findings of the current study may help to give rise to a curriculum review focused on suitable learning objectives, learning tools, consistent assessment methods, and course goals. For example, the findings indicate that adding another subject to the Pharmacy curriculum involving would help to fulfill the expectations of half of the students in the pharmaceutical care course, who mentioned wanting to work with real patients when learning about pharmaceutical care.

Limitations: The generalizability of this study's results is limited since it included only a small number of participants from a single university, and used convenience sampling. Therefore, its results may not be representative of all pharmacy students. Additionally, most of the survey questions used a Likert-type scale to register responses, thus, restricting the respondents' ability to express or expand on their personal opinions about issues.

Conclusion: Most of the participants appeared to react positively to the innovative aspects of the course, judging by the high questionnaire response rate and the specific responses. The students perceived the learner-centered methods used in the course as providing them with an appropriate environment in which to demonstrate their pharmaceutical care competencies. Students reported that the preceptors significantly enhanced their teaching and conducted clearer and more motivating classes. It seems that pharmacy education is on the right path in preparing professionals to focus on patient care. Furthermore, student opinion surveys can help to identify potential improvements to the curriculum of the course, and this study may help to provide a starting point for institutions as they initiate dialogs aimed at developing ways of assessing the experiential teaching skills of faculty members.

Table 1: Specific lessons in the pharmaceutical care course and their corresponding teaching methods and learning strategies.

Contents	Teaching Method or Learning Strategy	Description of method
Drug-related morbidity and mortality; Pharmaceutical care: historical and conceptual aspects	Dialogic classroom expository	Expository lessons, promoting dialog between teachers and students. The construction of knowledge occurs through the exchange of information, the asking of questions, and discussions about and reflections on reality. Students, because they bring their knowledge and life experience to the classroom, play a major part in the teaching and learning that takes place.

Drug administration Measurement of clinical parameters Invitation to use pharmaceutical care services	Role play	In the role-playing exercises, the pharmacy students must initiate patient-pharmacist interactions, assess clinical parameters, offer counseling concerning medication use, and/or to invite the patient to use pharmaceutical care services. In this lesson the patient role is played by another pharmacy student. At the end of the scene the roles are reversed. The roles were distributed, allowing each student 5–10 minutes to review his/her role and ask the instructors for clarifications of the questions.
Pharmacotherapy Review Implementation of pharmaceutical care service	Lecture	Presentation of topics by an invited professional pharmacist
Drug information resources Determination of desired clinical and pharmacotherapeutic outcomes Identifying, preventing, and solving drug-related problems Prioritizing drug-related problems and establishing measurable endpoints Care plan development	Case study	Through a series of discussions of cases, students are expected to be able to search for evidence-based information about the health problems mentioned and related pharmacotherapy. In addition, students will acquire and/or reinforce their skills in determining whether a patient's undesirable signs/symptoms are related to drug therapy, and if so, to determine how these symptoms are related to the drug therapy and how the drug therapy problem should be solved.
Communication skills Establishment of the therapeutic relationship Initial Assessment of a patient: Determine who your patient is as an individual by learning about the reason for the encounter, the patient's demographic characteristics and experiences with medications, and other relevant clinical information	Simulated Patient	A postgraduate pharmacy student trained to play the role of a patient presents a standardized scenario. The simulated patient interacts with the pharmacy student and the student works to establish a therapeutic relationship and conducts an initial evaluation.

Table 2 – Assessment of pharmaceutical care course, of teacher and student self-assessment (N=37)
(1= Strongly Disagree; 2 = Disagree; 3 = Neither Agree Nor Disagree; 4 = Agree; 5 = Strongly Agree)

ASSESSMENT OF THE PHARMACEUTICAL CARE LESSONS	1		2		3		4		5		Mean (SD)
	n	%	n	%	n	%	n	%	n	%	
The lessons stimulated discussion in the classroom.	0	0.00	0	0.00	3	8.11	21	56.76	13	35.14	4.27 (0.60)
The lessons stimulated individual study.	0	0.00	2	5.41	4	10.81	22	59.46	9	24.32	4.02 (0.76)
The time available for the lessons was appropriate.	0	0.00	8	21.62	11	29.73	10	27.03	8	21.62	3.48 (1.07)
The learning objectives were explained.	1	2.70	0	0.00	4	10.81	19	51.35	13	35.14	4.16 (0.83)
The learning objectives were achieved.	1	2.70	0	0.00	7	18.92	24	64.86	5	13.51	3.86 (0.75)
During the course, students were provided with opportunities to demonstrate their knowledge.	0	0.00	2	5.41	2	5.41	19	51.35	14	37.84	4.21 (0.78)

	1		2		3		4		5		Mean (SD)
Throughout the course, feedback was provided to help direct learning.	0	0.00	4	10.81	5	13.52	19	51.35	9	24.32	3.89 (0.90)
The facilities used for the lessons were appropriate.	2	5.40	16	43.24	10	27.03	4	10.81	5	13.51	2.83 (1.14)
The lessons had relevance for my professional/personal development.	1	2.70	0	0.00	1	2.70	18	48.65	17	45.95	4.35 (0.78)
This course is related to other courses of the program.	0	0.00	1	2.70	4	10.81	24	64.86	8	21.62	4.05 (0.66)
The plan of the course was organized.	0	0.00	1	2.70	6	16.22	21	56.76	9	24.32	4.02 (0.72)
The students were referred to relevant texts and other study materials	1	2.70	2	5.41	9	24.32	20	54,05	5	13,51	3.70 (0.88)

ASSESSMENT THE OF TEACHER	1		2		3		4		5		Mean (SD)
	n	%	n	%	n	%	n	%	n	%	
Was accessible and available to answer students' questions.	0	0.00	1	2.70	5	13.51	19	51.35	12	32.43	4.16 (0.76)
Encouraged students to participate in discussions.	0	0.00	0	0.00	4	10.81	17	45.95	16	43.25	4.32(0.67)
Encouraged student participation in the practical classes.	0	0.00	0	0.00	5	13.51	21	56.76	11	29.73	4.16 (0.64)
Encouraged students to search for evidence and justify their recommendations.	0	0.00	1	2.70	5	13.51	22	59.46	9	24.33	4.05 (0.70)
Demonstrated the ability to synthesize and present information in a clear and organized manner.	0	0.00	2	5.41	5	13.51	15	40.54	15	40.54	4.16 (0.86)
Was punctual.	1	2.70	6	16.22	8	21.62	17	45.95	5	13.51	3.51 (1.01)
Established good interpersonal relationships with the students.	0	0.00	1	2.70	5	13.51	20	54.05	11	29.74	4.10 (0.73)
Demonstrated the ability to criticize and receive criticism.	2	5.41	2	5.41	8	21.62	17	45.95	8	21.62	3.75 (1.06)
Presented the content of the lessons clearly.	1	2.70	1	2.70	1	2.70	15	39.39	19	51.52	4.35 (0.89)
Used satisfactory teaching procedures.	1	2.70	1	2.70	4	10.81	18	48.65	13	35.14	4.10 (0.90)
Helped clarify the purpose of the course evaluation activities.	1	2.70	4	10.81	11	29.84	14	37.84	7	18.92	3.62 (1.01)
Contributed to a favorable learning environment.	0	0,00	4	10.81	9	24.33	20	54.05	4	10.81	3.67 (0.82)
Made good use of class time.	1	2,70	1	2,70	6	16.22	20	54.05	9	24.32	3.94 (0.88)

STUDENT SELF-ASSESSMENT	n	%	n	%	n	%	n	%	n	%	Mean (SD)
I felt that I was able to learn the content.	0	0.00	0	0.00	1	2.70	21	56.76	15	40.54	4.37 (0.54)
I had difficulty retaining the content that was taught in the class.	11	29.73	13	35.14	9	24.32	4	10.81	0	0.00	2.16 (0.98)
I had difficulty in visualizing how the content could be applied in practice.	13	35.14	17	45.95	4	10.81	3	8.11	0	0.00	1.91 (0.89)
I had difficulties with searching for relevant information about diseases or medications	9	24.32	17	45.95	11	29.73	0	0.00	0	0.00	2.05 (0.74)

											Mean (SD)
This course provided me with the opportunity to practice and improve my competencies.	1	2.70	0	0.00	5	13.51	19	51.35	12	32.43	4.10 (0.84)
As a result of the course I can identify, prevent, and resolve drug-related problems.	0	0.00	2	5.41	9	24.32	21	56.76	5	13.51	3.78 (0.75)
I am able to prioritize drug-related problems and select those that need to be solved first.	0	0.00	0	0.00	6	16.22	23	62.16	8	21.62	4.05 (0.62)
I used the study materials indicated.	1	2.70	0	0.00	12	33.43	20	54.05	4	10.81	3.70 (0.77)
I was motivated to learn more.	0	0.00	1	2.70	4	10.81	22	59.46	10	27.03	4.10 (0.69)
As a student I contributed to a favorable learning environment.	0	0.00	0	0.00	11	29.73	19	51.35	7	18.92	3.89 (0.69)
The group contributed to a favorable learning environment.	0	0.00	1	2.70	15	40.54	18	48.65	3	8.11	3.62 (0.68)

Table 3 – Assessment of contents and teaching method used in the pharmaceutical care course (N=34)

	Approach to this theme is relevant to pharmaceutical care practice.	The way the lesson was ministered was adequate to the content.	The teaching methodology used motivated learning.	The lesson was interesting and stimulating.
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Drug-related morbidity and mortality; Pharmaceutical care: historical and conceptual aspects (Dialogic classroom expository) n=34	4.3 (0.7)	4.3 (0.5)	4.0 (0.7)	3.9 (0.9)
Measurement of clinical parameters (Role Play) n=33	4.6 (0.5)	4.4 (0.6)	4.5 (0.6)	4.4 (0.6)
Drug administration (Role Play) n= 29	4.7 (0.4)	4.3 (0.8)	4.3 (0.7)	4.2 (0.7)
Invitation to use pharmaceutical care services (Role Play) n= 24	4.3 (0.7)	4.0 (0.8)	3.9 (0.8)	4.0 (0.9)
Pharmacotherapy Review; Implementation of pharmaceutical care service (Lecture) n=21	4.5 (0.5)	4.4 (0.6)	4.3 (0.8)	4.5 (0.7)
Communication skills; Establishment of the therapeutic relationship; Initial assessment of patients (Simulated patient) n=31	4.5 (0.6)	4.1 (0.9)	4.2 (0.7)	4.3 (0.8)
Drug information resources (Study of case) n = 28	4.4 (0.7)	4.3 (0.7)	3.9 (0.8)	3.9 (0.8)
Determination of desired clinical and pharmacotherapeutic outcomes; Identifying, preventing, and solving drug-related problems; Prioritize the drug-related problems and establish measurable endpoints; Care plan development (Study of case) n= 33	4.6 (0.5)	4.3 (0.5)	4.2 (0.9)	4.0 (0.9)
Kruskal-Wallis	**0.285**	**0.432**	**0.05**	**0.07**

(1= Strongly Disagree; 2 = Disagree; 3 = Neither Agree Nor Disagree; 4 = Agree; 5 = Strongly Agree)

Table 4 – Students' opinions about the pharmaceutical care course.

WHAT STUDENTS MOST LIKED IN COURSE

Lessons
All of the practical lessons
The lessons on measuring clinical parameters
The lessons on drug administration
The approach to content of the theoretical lessons
Relationship in class
Student participation in the lessons
The relationships established between the students and the teachers
The discussions in class
Association between course and pharmaceutical professional practice
Contact with patients
The relationship between course content and professional practice
The teaching methods
The use of simulated patients
The lessons involving real patients

WHAT STUDENTS LEAST LIKED IN COURSE

Structure
The class venue
The class time
The lack of pharmacy lessons
The number of lessons
The short time available for the lessons
Assessment
The written exam
The evaluation criteria
The OSCE evaluation
Little contact with real patients

WHAT COULD BE IMPROVED

Increase contact with real patients
Assessment
Improve the preparation of the written exam
Reduce the stress of the OSCE
Explain the assessment criteria more clearly
Lessons
Increase the number of practical lessons
Increase the workload of the course
Improve the structure of the lessons
Encourage greater involvement by students

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