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Feedback of pharmacy students toward teaching-learning pharmacology in Northern Cyprus

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ABSTRACT

This study explores pharmacy students' feedback on teaching–learning methods of pharmacology in faculties of pharmacy in Northern Cyprus universities. 150 students randomly selected and participated by filling self-administered questionnaires. The majority of participants were female and most of them were in the 4th year of their study. The results showed that high percentage of students had good understanding and grasping of pharmacology subjects in class, and the pharmacology is the most favored course in comparison with others. Moreover, participants taught that pharmacology course will have most usage in their future pharmacy practice. It can be concluded that the general attitude of students toward pharmacology were positive; however, some changes in curriculum are still required in order to make the pharmacology courses more interesting.

Keywords: Pharmacology, student attitude, pharmacy students, learning, student feedback.

INTRODUCTON

Pharmacology is the fundments of rational therapeutics [1,2]. It is one of the most emerging branches in pharmaceutical sciences. The primary goal of teaching pharmacology to undergraduate students can be contented if they know the subject with respect to recent progresses in this field. This needs progressive review and modifications in teaching methodology and evaluation methods in pharmacology [1, 3].

Student assessments have become routine at most colleges and universities. Data from many studies indicates that most universities and colleges around the world use student ratings of instruction as part of their evaluation of teaching effectiveness [4, 5, 6, 7, 8].

Student's perceptions constitute effective methodologies for improvement on teaching sciences like pharmacology in health related schools [9]. This kind of researches in undergraduate programs has begun as far as 19th century [10, 11]. Furthermore, the researches on feedback of students focused on subjects like learning outcomes, teaching and assessment methodologies, academic staff and educational environment [12]. Student's ideas are an accepted tool for reviewing teaching and assessment of methods and developing new teaching methodologies in undergraduate programs around the world [1, 3, 9, 13]. Moreover, student's ideas are used to recognize which teaching methods they think will be most effective to make it easier for them to learn pharmacology conceptions [14]. Medical students noted that using problem stimulated learning in

pharmacology help them to understand the topics better and help reasoning skills and prepare them for practical skills [15, 16, 17, 18, 19]. Rodriquez et al. reported that innovations in teaching methods of pharmacology will improve the basic knowledge of medical students [20]. In another approach, it has been suggested that integrated, multidisciplinary case based sessions, are valuable teaching and learning tools in pharmacology [21].

The results from a survey in Pharmacy faculty showed that students need more emphasize on drug interactions, applied pharmacology and therapeutics, toxicology and pathology, furthermore, students asked for more clinical teaching [22].

In research paper about teaching methods pharmacology students preferred integrated, problem and patient based teaching methods, also they emphasized that pharmacology is above all other courses, and more clinical pharmacology subjects should be added to curriculum [23]. In a research conducted by Kuruvilla et al., it was suggested that subtends think using computer assisted learning with practical pharmacology will improve their cognitive skills and help them understand the drug pathways in better ways [24].

The aim of teaching pharmacology can be achieved only if students are well conversant with the subject with respect to innovations in this course. This needs continuous review and modifications methodology and evaluation methods in teaching pharmacology. The primary objective of this study is to evaluate the pharmacology teaching methods in Northern Cyprus. Evaluation of teaching methods leads to improve student learning and helps lecturers to see if their method was effective or not. This study focuses on students' feedback which is the most common used source of information to assess and improve teaching effectiveness. In addition, understanding current perceptions held by future pharmacists regarding pharmacology and its role in research and clinical practice is the secondary objective of this study. This research is a step towards achieving the objectives by evaluating the perception of students, feedback on teaching-learning methodology and assessment methods in pharmacology.

MATERIAL AND METHOD

This cross-sectional study was done among pharmacy students in Northern Cyprus who were in 3rd, 4th or 5th year of their studying. A standard questionnaire was prepared according to previous studies which were done on medical schools [3, 23, 25, 26] and

appropriate modifications were made in order to suit the questions well for pharmacy students. This research project was approved by Near East University ethics committee (YDU/2016/36-275). The questionnaire was validated by doing a pilot study among 30 students. The questionnaire was consisting of 20 questions. 150 students randomly filled the questionnaire. The completed questionnaires were collected and analyzed by using SPSS version 22. The descriptive analysis is done on each question by using SPSS. Frequency was expressed by percentage. The Pearson Chi-square test was used to assess any significant difference between percentages of frequency responses for each question. $p < 0.05$ was considered significant.

RESULTS AND DISCUSSION

It is very important to emphasize the academic need of reviewing the teaching programs from time to time and making adequate modifications, to keep pace with progress in the subject and to cope with the requirements of the beneficiaries [1]. Regarding the Figure 1, it is clear that the majority of students who participated in survey were female with just under 80%. Moreover, around 80% of student's parents have worked in non-medical section and the rest have worked in medical section.

As it can be seen from the Figure 2, we can say that the most of students are Iranian (32%) meanwhile Cypriot students are in the second stage with only 8% differences. In the same time, Turkish students with 18% participation are in the next level. Without a doubt, this survey was done between multicultural students. It means that the answers will cover ideas of people with different nationalities.

Based on the Figure 3, it is clear that Students from 4th year were more eager and willing to participate in our research by 63%, 32% participated from 3rd year and the rest participated from 5th year (5%). Results of questionnaires' analysis are shown in Table 1 and will be discussed in the following paragraphs.

Sixty-six students strongly agreed that pharmacology is their favorite subject meanwhile only three of them strongly disagreed and 24 students stayed neutral. It is obvious that, the majority of students considered pharmacology as a favorite subject. It is in contrast to previous researches which are stated that pharmacology is not one of the favorite topics (27, 28). In addition, most of the students (34.0%) agreed to be a pharmacologist meanwhile fewer than 30% of them stayed neutral. The number of students who were agree or disagree to work as a pharmacologist

are in the same level around 15% and the rest were strongly disagree to select pharmacology as their future career. Thus, students' attitude toward becoming pharmacologist was found favorable which is at odds with Zgheib et. al researches. They stated that students' interests appear more biased towards clinical careers with prospective incomes far better than pharmacology careers [25].

More than 82% of students agreed or strongly agreed that the subject will help them to use the drugs rationally in the future however only 6.8% of students were in the opposite site and the rest with around 11% maintained neutral. The clinical pharmacology and therapeutics department at KIST Medical College, Lalitpur, Nepal was carried out to teach students to use necessary drugs rationally. Students were taught about necessary drugs, assessed prescribing according to WHO/INRUD prescribing indicators and picked the personal drug for a specific illness condition. They also verified the appropriateness of the picked personal drug for a specific patient and wrote the prescription. Moreover, they communicated drug and non-drug measures to control the condition with a simulated patient. In addition, students critically assessed medicine advertisements, learned how to deal with clinical problems and learned how to optimize time spent with medial representatives. They became familiar with independent sources of drug information. Finally, student opinion about the sessions was collected previously and was positive [29].

Pharmacology lectures were interesting and stimulating for most of the pharmacy students who were strongly agree (46.0%) or only agree (32.7%) with this statement meanwhile the number of students who are not interested in pharmacology lectures accounted for just under 7% of students. From this, it can be concluded that lecturers' abilities to present pharmacology attract students. Showing videos about different illness symptoms and how a special drug helps in relieving those symptoms, using case reports in classes and giving examples from real life are fitting examples.

Around half of the students agreed that the pharmacology subjects help them to develop problem solving and logical reasoning skills moreover about 31% of them were strongly agree with it however 6.7% of students were refuted it and the rest stayed neutral.

About one third of students strongly agreed that practical session on coherence of prescription and evaluation of drug advertisement are needed as well as 46.6% of students who were agree with this statement. Therefore, we can understand that student asked for more practical session on evaluating prescriptions written by other Health care professions in order to better understand the importance of rational usage of drugs and the cases that will lead to irrational usage of medicine like polypharmacy, abuse or disuse of medicines.

The most number of students agreed that pharmacology teaching increase their capacity for self-directed learning. There is not a great deal of difference between the number of neutral and strongly agree participants. In the same time there only just under 7% opposed.

Self-learning improves active learning and critical thinking which in turn enhances self-reliance and in this process instructors find an ability to manage their time adequately to augment skills and knowledge. In addition, self-learning could be an enjoyable experience for students. Critical thinking promoting development, communication, affording an avenue for discovering misconceptions, promoting concept formation, growing motivation and cooperative learning skills and values and attitudes are the mainly advantages of active learning methods. Some specialist recommended different types of puzzles and interactive games [30] as active learning methods which create an interactive learning experience by revolutionizing inactive learning materials into learning episodes where students are active participants [30]. Numerous studies have shown effective application of active learning methodologies in teaching pharmacology courses to health science students [31].

More than half of the students will pursue pharmacology in post-graduate study which is at odds with Abdulghani and Al-Naggar researches who believed that students do not prefer pharmacology as a subject in post-graduate study probably due to inadequate knowledge about this subject, which is vital for booming careers in the clinical research and pharmaceutical industries [32].

As it can be seen from the Table 1, 45% of students thought that assessment system concentrates on ability to acquire facts rather than the development of problem solving skills, 9.4% opposed and 34.2% responds neutrally. Considering the results, more than half of the students think the assessment system is fair; on the other hand, 20% of students disagreed and 26% remained neutral. Although the assessment system was transparent and obvious for 55% of students, 36% maintained neutral and only 8.6% find

the assessment systems unclear. From these it can be concluded that the assessment system in Northern Cypriot universities should be revised and reviewed. Most of the students (72%) thought that pharmacologist is expert therapeutic meanwhile, 25.3% maintained neutral and the rest refused it. As profession in pharmacotherapy means that person is responsible for ensuring the safe, appropriate and economical use of drugs in patient care, so this person has responsibility for direct patient care and often functions as a member of multidisciplinary team and frequently the primary source of drug information for other healthcare professionals.

As the Figure 4 reveals, LCD presentation is the most popular lecture presenting method (69.4%) among students meanwhile there is not a great deal of difference between white/black board and overhead projector. Students favored to utilize LCD projection due to its ability to provide many intricate diagrams, figures or specific topics could be shown by screening videos such as demonstrating action of drug on receptor. Furthermore, the majority of students preferred combination of these three methods due to improve on learning quality. Combination of all these teaching tools give the students a chance to participate more in class and help them improve their logical reasoning skills and problem solving skills. For example, the lecturer can draw the organ working system while presenting a drug effect on that organ so the students will get better idea of the mechanism.

Regarding the Figure 5, we can say that most of the students prefer lectures and active learning session. The former one account for around 72% and the latter one constitutes for 65.8% but the rest is considered for less than 50%. The utilize of short movie references in the period of pharmacology course, as a means of active learning, leads to students relate the theory to practice. Students are also excited to participate in the class and it can be used as a sectioning break to keep students motivated during the lecture [33]. Other researchers [9] ranked seminars lowest among teaching methods.

Brunton et al. [34] illustrated the clinical seminars popularity among students in restorative dentistry. This should be adopted in pharmacology where seminars relating to treatment planning of specific illness could be organized. More than seventy percent of students preferred being taught by instructors however in researches conducted with dental and medical students the popularity decreased to less than 11% [9]. In a similar way, Gerzina et al. concluded that lectures were ranked very highly by students as a

valuable way for assessment preparation as they provided a large amount of course content [35].

When students were asked about methods which they use for learning pharmacology, 77.3% said that they understood and have good grasping of subject in class; around 41% prefer study in groups and cramming the subject only compromise less than 25% (Figure 6). This clearly shows that students had full concentration in classes, due to lecturers' high ability in creating interest in students about the subject. Also students mentioned that group studying in exam periods is one of promising tools toward success.

The students rated pharmacology above all other subjects (69.7%) while some students believed that there is not a great deal of difference between pharmacology and other subjects by around 32%. Following Figure 7 we can conclude that pharmacology subject is the most favorite subject among all other subjects in pharmacy courses. This statement can be evidence by question number 1 in Table 1.

When the students were asked about the methods to make pharmacology teaching more interesting, about 57.0% students suggested addition of problem-based learning in conventional teaching and 35.6% preferred microteaching sessions and 48.3% mentioned integrated teaching (Figure 8). Team-based learning (TBL) technique in pharmacology and clinical pharmacology courses were effective and improved formulary development and prescription writing. TBL is a student centered, problem based method to learning that promotes learning and team work together with maintaining individual accountability [25, 36]. This is also proven with many studies illustrating that TBL results in higher test scores when compared to case-based group discussions or traditional lecturing in pathology, psychiatry and anatomy courses [25] Problem-based learning (PBL) embraces an educational theory intended for improving the personal learning qualities exemplifies self-motivation, life-long learning, professional behavior, active learning, critical thinking, effective communication and collaborative team work sprite of the students, via the feedback on the group learning process [37]. PBL stresses instructor-directed, interdisciplinary self-learning organized around patient problems and tried to develop skills under cognitive/intellectual, affective/communication and psychomotor/practical domains. Moreover, it assists the students to understand and develop interest in the multidisciplinary/need based curricula and rational

drug prescribing [38]. These results recommend that other activities such as visiting clinics or doing PBL should be organized to improve intrinsic interest in the subject matter. It has been proven in different researches that PBL enhances students' approach to self-directed learning and motivates them toward lifelong learning process [9].

From this, it can be concluded that addition of problem based learning methods and team based teaching methods are needed in teaching system in Northern Cyprus pharmacy faculties. This will increase students' participation in class and the monotone nature of class will improve so far.

As it can be seen from Figure 9, majority of students were preferred multiple choice question (MCQ) tests by around 75%. Final examination at the end of semester stands at the second place of preference by 38.1%. Moreover, oral examination was selected around 22.5% but preliminary examination was most unfavorable assessment type.

The central nervous system and general pharmacology are the most favorite topics. The gastrointestinal and respiratory systems are in the next level of students' preference by around 48.5%. Endocrine, cardiovascular system and chemotherapy are considered as interesting topic by 45.3%, 43.3% and 41.3% respectively. The autonomic nervous system is the least interesting topic by just under 37% (Figure 10). Thus, these last four topics need to be emphasized more to attract students' attention. This could be done by utilizing microteaching session, problem-based learning, patient-related teaching and

interactive teaching with strict bilateral communication in conventional teaching.

Considering the Figure 11, we can say that pharmacology has the greatest impact on pharmacy practice (80%) however its effect on prescription reading and human experiments is noticeable by 61.3%. Although the effect of pharmacology on experimental screening of new drugs, comments on fixed dose combinations and spotters are not in the same level as previous topics, it is still considerable. Thus, it is highly recommended to provide students with more ideas about the role of pharmacology in their future career, the impact of it in rationally drug usage and high research area in this field.

CONCLUSION

The students' feedback reviews illustrated that majority of the students were females signifying the pharmacy profession popularity among women. The students' feedback serves as an array of effective methodologies in pharmacology teaching. Also, there is an obvious need for modification of undergraduate curriculum so as to make pharmacology more interesting and practicable. It is obvious that pharmacology instructors need to discuss more about practical usage of this course in future for students. Pharmacy students have different educational abilities and may benefit from the availability of different types of teaching methods like, integrated teaching, microteaching and problem based learning because it enables them to get the whole of idea of subjects better and fulfill their information need.
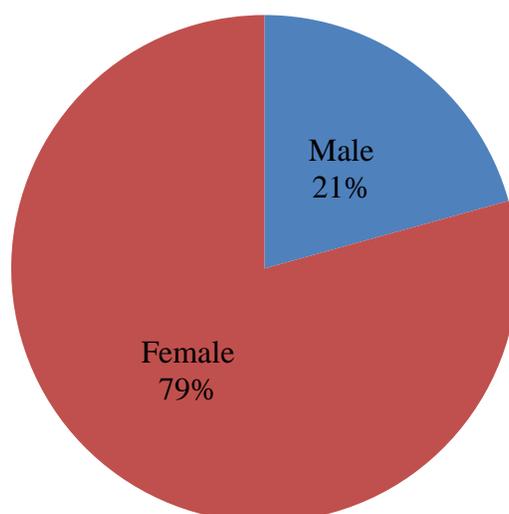

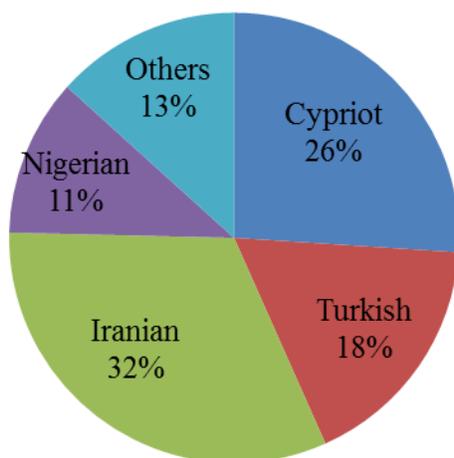Figure 1. Participants gender distribution
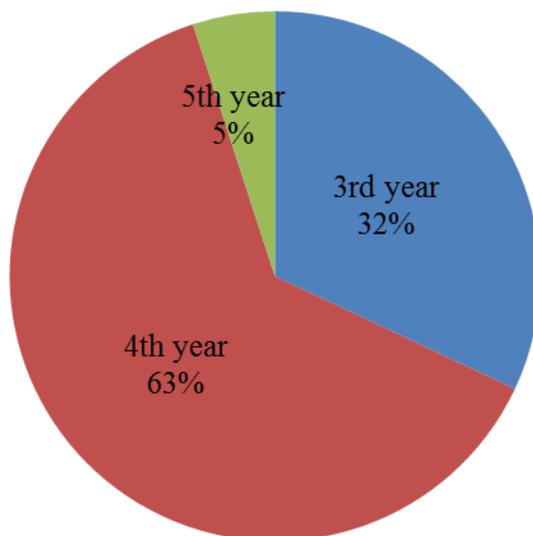
Figure 2. Participant nationality distribution
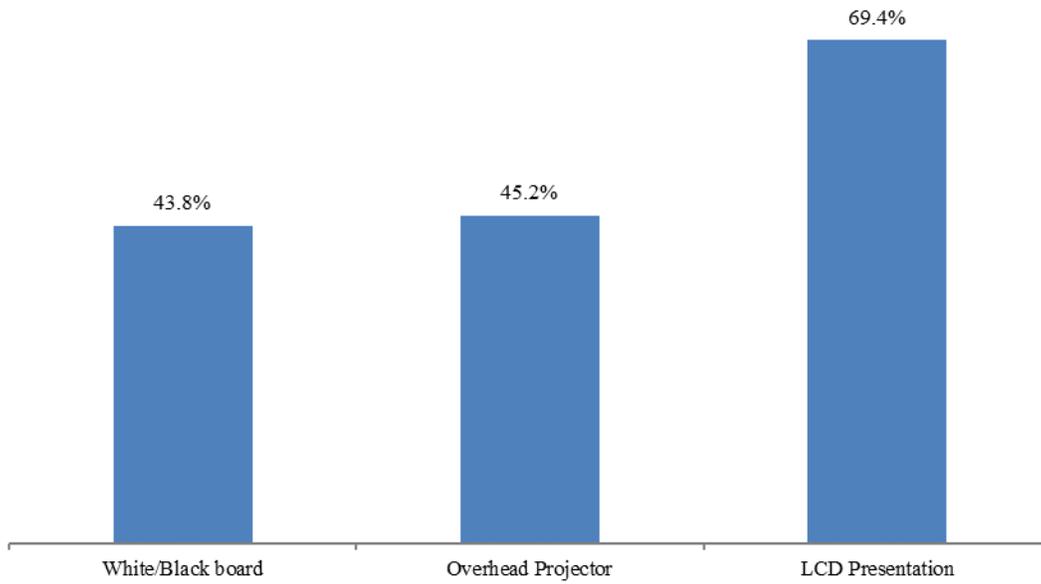

Figure 3. Participants class year distribution

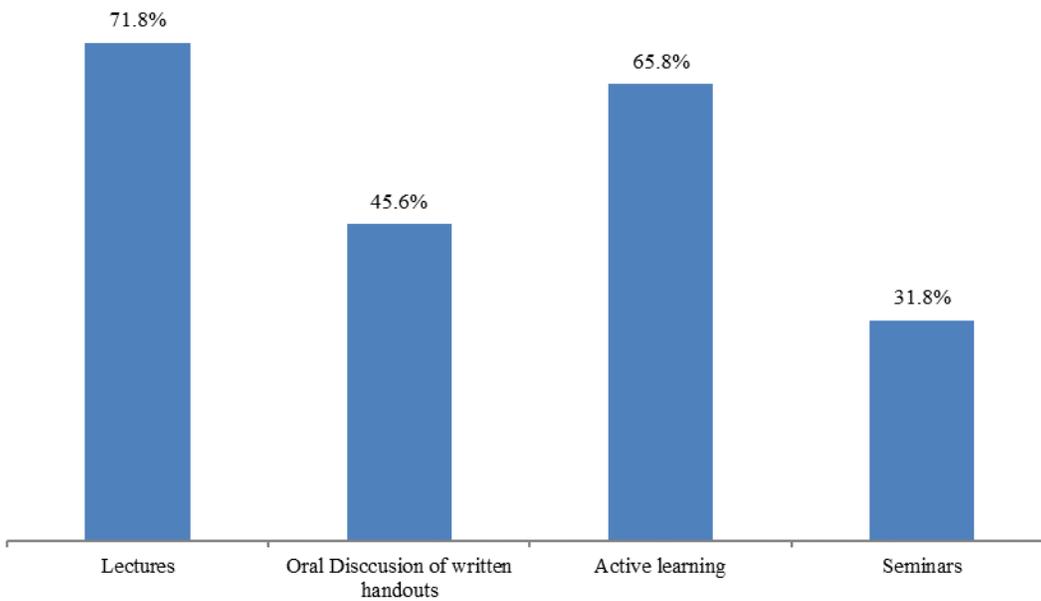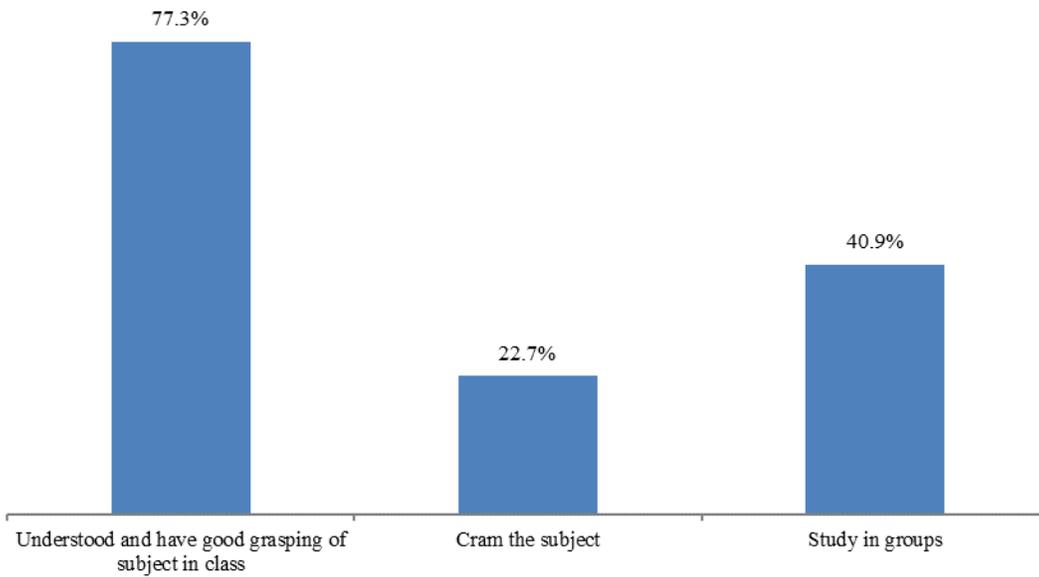Figure 4. Choice of method during lecture presentation. *p*<0.05 was considered significant

Figure 5. Teaching Methods p<0.05 was considered significant.

Figure 6. Methods of learning. *p*<0.05 was considered significant
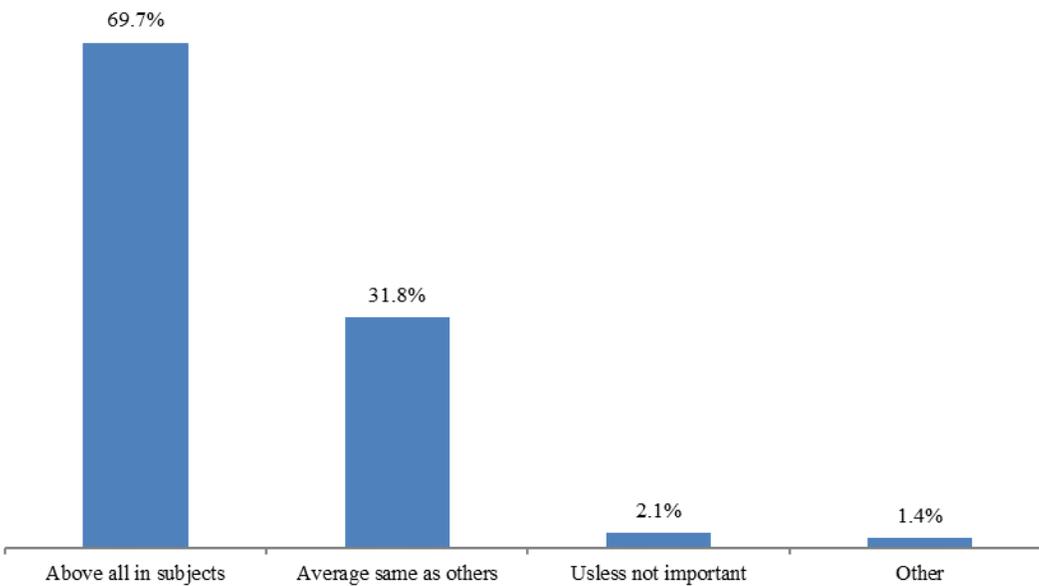
Figure 7. Rating Pharmacology in comparing to other subjects. *p*<0.05 was considered significant
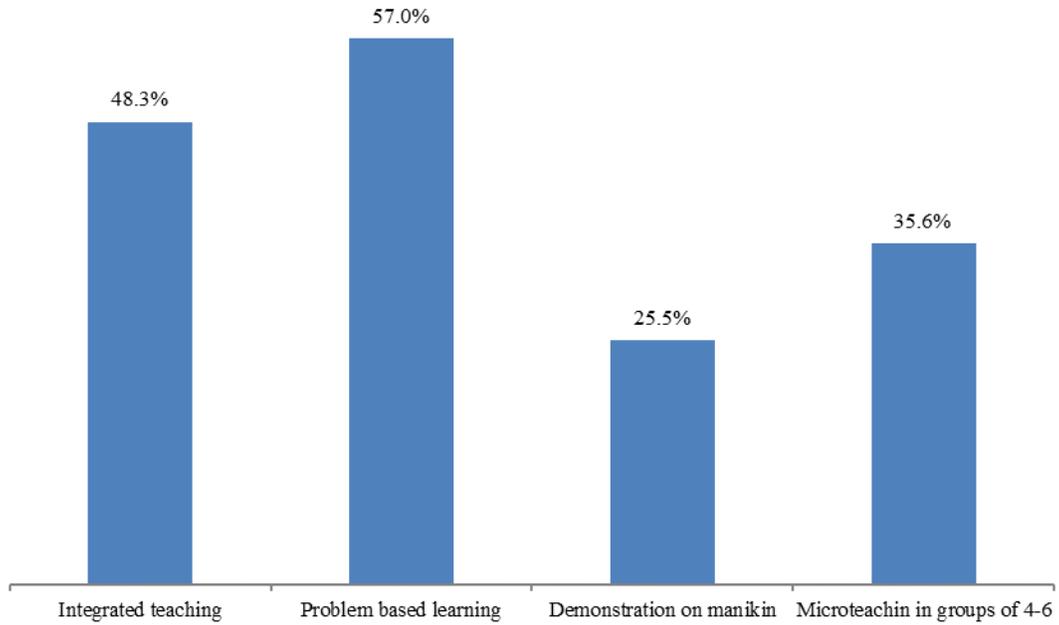
Figure 8. Teaching methods to be add as part of regular teaching. *p*<0.05 was considered significant
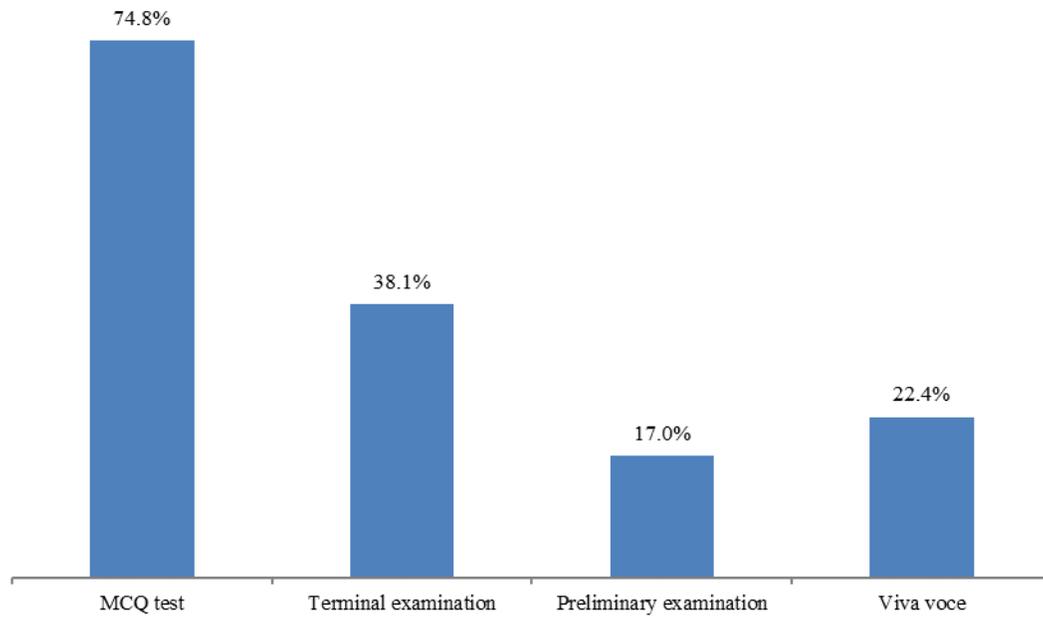
Figure 9. Assessment preference. *p*<0.05 was considered significant
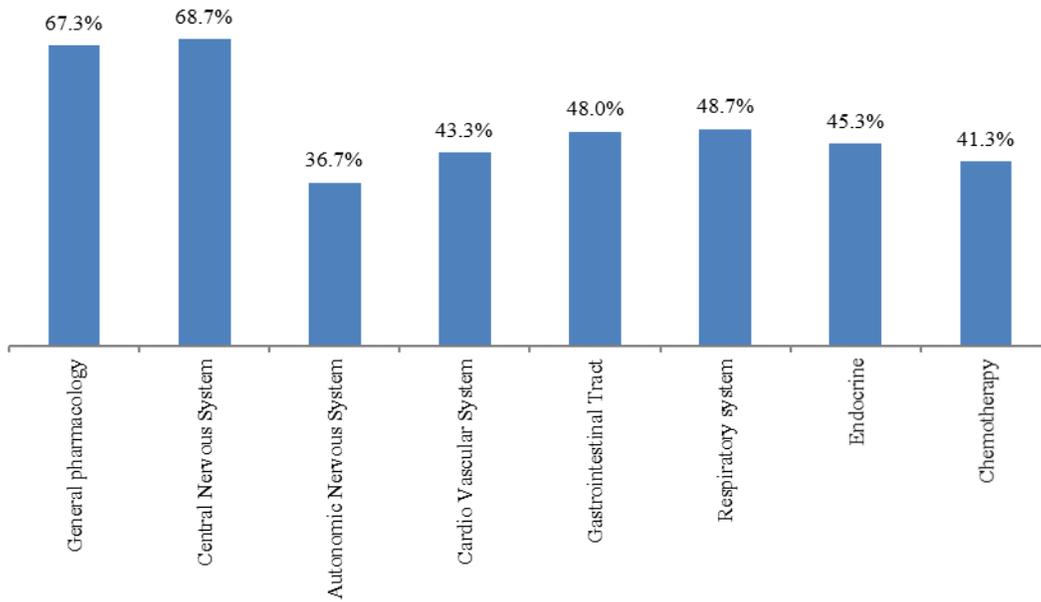
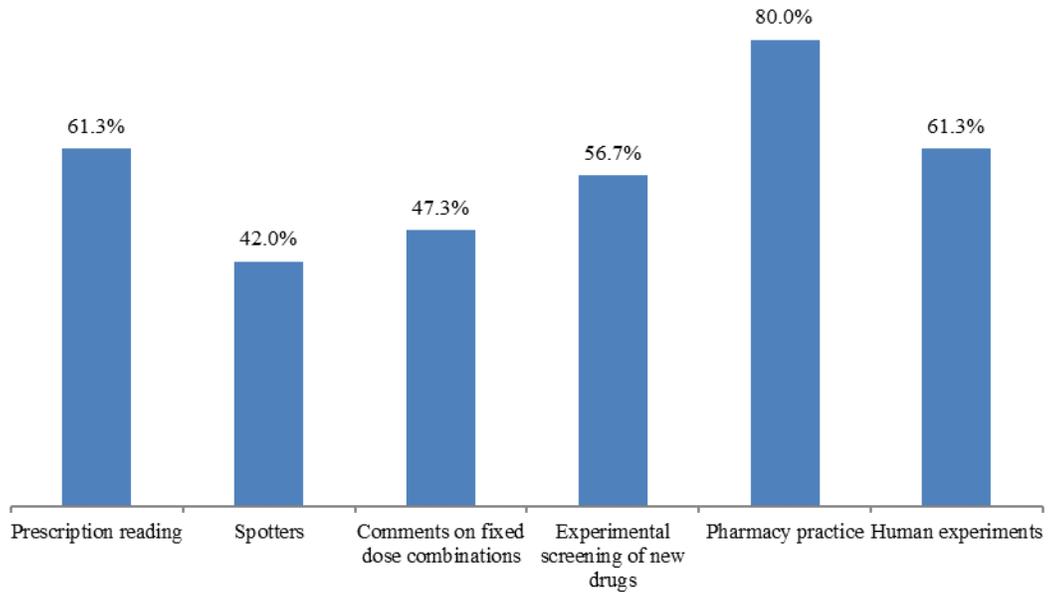Figure 10. Topics found interesting. *p*<0.05 was considered significant

Figure 11. Practical pharmacology usage in future. *p*<0.05 was considered significant

Table 1. Student's perception and opinion towards pharmacology teaching and learning

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Pharmacology is my favorite subject in pharmacy	2.0%	0.0%	16.0%	38.0%	44.0%
The subject has created to knowledge base which will help in choosing drugs rationally in my future practice	3.4%	3.4%	10.7%	42.3%	40.3%
I find pharmacology lectures interesting and stimulating	5.3%	1.3%	14.7%	32.7%	46.0%
The subject has helped me to develop my problem solving and logical reasoning skills	4.0%	2.7%	16.0%	46.0%	31.3%
I would like practical sessions on rationality of prescription and evaluation of drug advertisement	6.0%	0.0%	15.5%	46.6%	33.8%
The assessment concentrates on ability to acquire facts rather than the development of problem solving skills	5.4%	9.4%	34.2%	45.0%	6.0%
The pharmacology teaching has inculcated in me a capacity for self-directed learning	4.0%	2.7%	23.5%	46.5%	23.5%
I will consider pharmacology as one of my subjects for post-graduation	4.7%	11.3%	20.7%	39.3%	24.0%
The assessment system in pharmacology is fair	6.0%	14.0%	26.0%	35.3%	18.7%
The assessment process is transparent	3.3%	5.3%	36.0%	39.3%	16.0%
Pharmacologists respected as expert therapeutics	2.7%	0.0%	25.3%	40.7%	31.3%
Wish to be pharmacologist	6.7%	14.7%	29.3%	34.0%	15.3%

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