

DEBATE AND EDUCATION

Assessing skills in pharmacology in medical students

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*Department of Pharmacology, Faculty of Medicine, Comenius University, Bratislava, Slovakia. viera.kristova@fmed.uniba.sk***Abstract**

The results of this pilot survey have shown the importance of evaluation of medical student knowledge in pharmacology using three independent parts of the examination. The final mark includes the results of a written test, oral examination and evaluation of seminar essay. We evaluated students with final grade A (n=76) and F (n=61) in relation to the results of tests and seminar essays. Most of the students with grade A (88.2 %) wrote the test in the upper range (90–99 %) and their seminar essay evaluations were grade A in 82.9 %. A significant correlation between the results in the test and the mark obtained in the seminar essay was found ($r=0.22$, $p<0.05$). Another group of students with grade F obtained low scores in the test (57.4 %), and a relatively large part of students got satisfactory results in test (42.6 %). In this group the quality of seminar essays was variable ranged from A to E. The evaluation showed that in students with final grade A were all three independent part of exam in agreement with final classification. The differences occurred in group of unsuccessful students who performed much better in written part than in the oral examination. The experience with the final assessment of medical student knowledge in pharmacology showed that the most important essay evaluation seems to be the oral form of exam. The results of seminar evaluations correspond satisfactory with the performance of students during the final exam and their effort may continue in diploma work, which is mandatory for all medical students (Tab. 2, Fig. 1, Ref. 2).

Key words: teaching pharmacology, evaluation, written test, oral exam, seminar essay.

Pharmacology has a unique position among the biomedical sciences occurring at a critical junction in medical curriculum, after completion of basic science courses and before clinical experience. At present, pharmacology represents a subject involving a large amount of knowledge and an increasing number of different pieces of new information on drugs and their effects. Therefore, teaching of pharmacology requires approaches, which stimulate the interest of students and increase the attractiveness of pharmacology at the theoretical level, particularly because the students have little experience with patients. The importance of understanding pharmacological principles needed for the solution of future clinical problems seems to play a crucial role.

At this department, general knowledge and advances in pharmacology are offered to students in the form of lectures. A more interactive and specific form of teaching is represented by seminars. A part of the seminars is performed in the classical way, in which the teacher explains the topic and the students listen passively. These seminars are mainly on topics of general pharmacology with few demonstrations of drug effects on small labora-

tory animals. In most of the seminars we use the previously described form of problem-based learning (PBL), which has a favorable response in students (Tisoňová et al, 2005). PBL increases effectiveness of teaching in comparison with the classical form of seminars (Michel et al, 2002). In our experience, teaching pharmacology in the form of PBL leads to obtaining the skills needed for decision-making process in pharmacotherapy. A very important part of our course of pharmacology is the preparation of a seminar essay in a written form associated with an oral presentation in front of other students during semi-

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Tab. 1. Evaluation of seminar essays in students with grade A (n=76).

Evaluation	Number of students	%
1	63	82.9
1.5	9	11.8
2	4	5.3

Tab. 2. Evaluation of seminar essays of students who did not pass through the exam (n=61).

Evaluation	Number of students	%
1	28	46.0
1.5	17	28.3
2	12	20.0
2.5	3	5.0
3	1	1.7

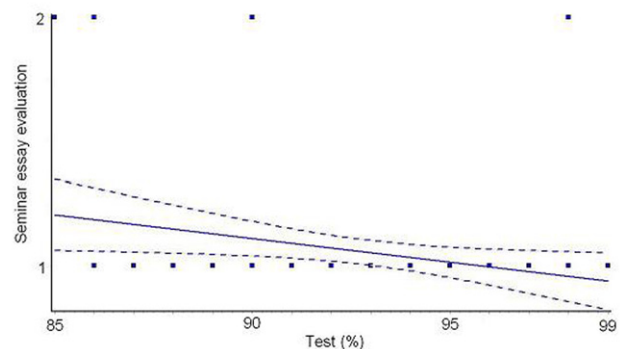
nars. The topic of presented seminar essays is usually very close to the subject of the given seminar. During the seminar essay preparation, the students have to find out relevant information in order to select the most important facts and to express their own insights into the conclusions. With some guidance from the teachers, the students have to show their ability to solve certain pharmacological problems by using sources of information in the library and/or Internet. Teachers, who have supervised the topics selected by students, evaluate these essays. Seminar essays become the most important tool for EBM (Evidence Based Medicine) implementation in teaching pharmacology.

Less clear is the optimal performance of the final evaluation of students' knowledge at the end of the course in pharmacology. The exams may be performed in an oral, written or a combined form and there is no unified opinion on which of these forms is the best. We have decided to assess the relationship among the individual parts of the evaluation process of medical student knowledge used at this department. They include the final mark based mainly on an oral examination, the results of a final written test and evaluation of the seminar essay.

Results and discussion

We evaluated students with final grade A (n=76) and F (failure, n=61) in relation to the results of tests and seminar essays. As expected, most of the students with grade A (67 out of 76, i.e. 88.2 %) wrote the test in the upper range (90–99 %) and their seminar essays were evaluated by grade A in 82.9 % (63 out of 76).

On the other hand, only some of students, which did not pass the oral part of examination, obtained low scores (71–89 %) in the written test (35 out of 61, i.e. 57.4 %). A relatively large number of unsuccessful students got satisfactory results (90–98 %) in written tests (26 out of 61, i.e. 42.6 %). Evaluation of seminar essays of students who failed in final examination clearly showed worse results compared to those in students with grade A (Tabs 1 and 2). In the group with final grade A only 17.1 %

**Fig. 1. Evaluation of seminar essays and tests using linear regression with 95 % confidence interval.**

had seminar essays worse than excellent compared to 54.1 % of students with final grade F. The quality of the seminar essays in the latter group was variable, as the grade A was achieved by 45.9 % of students, grade B by 28.3 %, grade C by 20 % and grades D or E by 6.6 % of students. It has to be noted that 50 students from the group with grade F failed repeatedly.

We have evaluated also the performance in the written test in comparison with the quality of seminar essays. A small but significant correlation was found between the results in the written test and the mark obtained for seminar essay ($r=0.22$, $p<0.05$) in the group of excellent students (Fig. 1). No such correlation was observed in students, which were unsuccessful in the final exam.

The presented evaluation showed differences between the results of the oral and written part of the exam in relation to the final classification. The differences were particularly pronounced in unsuccessful students. The students evaluated with final grade A had very good results in both the oral and written parts of the exam and they had also a very good seminar essay. This indicates that in excellent medical students all three independently evaluated parts of the exam were in agreement with final classification. However, the students, who did not pass the final exam performed much better in the written test than in the oral examination. Better results in the written part, which are not in agreement with the results obtained in oral exam, suggest that the students put too much attention to the memorization of numerous details related to the questions and answers of the tests. The fact that the students are used to performing multiple-choice tests from other theoretical subjects may also play a role. During oral examination medical student knowledge in pharmacology, the examiner concentrates on their ability to integrate the knowledge, to present their own opinion on specific pharmacological problems and to relate the learned facts on drugs to pharmacotherapeutical approaches. Based on our experience, teaching in the form of PBL may improve the understanding of pharmacology, which is reflected also in the knowledge during examination.

The results of seminar essays correspond satisfactory with the performance of students during the final exam. The topics of the seminar essays are chosen by the students from a list offered by the faculty. The students learn to search for information, to integrate the facts and many of them do it with enthusiasm. It

appears that such experience helps the students to better understand and learn the large amount of knowledge needed for the exam in pharmacology. Finally, the effort devoted to work on seminar essay may continue in diploma theses, which are mandatory for all medical students.

Conclusions

The results of this pilot survey have shown the importance of evaluation of medical student knowledge in pharmacology by using three independent parts of the examination as defined in the discussion. It should be noticed that the improvement of skills in pharmacology by medical students does not depend only on the quality of education but also on the intellectual capability of the students to remember and exploit a large number of facts. In any case, the most important part of the final assessment of medi-

cal student knowledge in pharmacology seems to be the oral part of exam. We suggest that the work on seminar essays and the PBL form of seminars significantly contribute to the improvement of the educational process.

References

- Michel MC, Bischoff A, Zu Heringdorf M, Neumann D, Jakobs KH.** Problem vs lecture-based pharmacology teaching in a German medical school. *Naunyn Schmiedebergs Arch Pharmacol* 2002; 366 (1): 64—68.
- Tisonova J, Hudec R, Szalayova A, Bozekova L, Wawruch M, Lasanovna M, Vojtko R, Jezova D, Kristova V, Kriska M.** Experience with problem oriented teaching in pharmacology. *Bratisl Lek Listy* 2005; 106 (2): 83—87.

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