



# The Effective Teaching Method of Pharmacology for the Students in the Faculty of Health and Nutrition in Tabriz University of Medical Sciences

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## ABSTRACT

**Introduction:** Pharmacology is one of the specific courses of the medical sciences students. Multiplicity of drugs and a lot of similarities in their characteristics make the learning of this lesson difficult and no common methods of teaching have been able to fix this problem so far. This study aimed to examine the effect of observing the dosage forms appropriate to each training session on enhancing learning pharmacology and comparing it with other traditional teaching methods. **Methods:** Fifty six Health Care Management and Family Health students in Tabriz University of Medical Sciences participated in this descriptive study. Each session was held using lectures and PowerPoint during half of educational classes and the other half was conducted using whiteboard and at the same time the teaching pharmaceutical dosage forms, their functions and properties were shown. A standardized questionnaire based on Likert scale was given to the students and the level of learning was reviewed by self-assessment method. The data were analyzed using SPSS and descriptive statistical parameters. **Results:** Teaching pharmacology through showing pharmaceutical dosage forms had significant effect on improving students' learning in both fields based on their self-assessment, so that more than 95% of students were satisfied with the teaching methods. From point of view of students, the understanding of pharmacology using whiteboard and showing pharmaceutical dosage forms was significantly more than PowerPoint. **Conclusion:** The students believe that the level of the learning pharmacology through using whiteboard along with observing the dosage forms appropriate to each training session is outstanding.

## Introduction

Pharmacology is one of the important and specific courses of the Health Care Management and Family Health students and based on approved outlines by Council of Medical Sciences planning, various topics including how to familiarize students with drug production and providing, drug classification, mechanism of action of drugs, drug interactions, side effects of drugs and medications used in various diseases must be taught.<sup>1</sup>

For teaching theoretical courses including pharmacology, various methods are used in the world. Presentation which is one of the most widely used methods for providing basic data and transmission of empirical science seems to be an appropriate method. But this way does not give the students the opportunity for thinking and deep learning necessary in learning.<sup>2</sup>

PowerPoint software, one of the new training tools in recent years for its use in educational environments

especially in universities, has increased rapidly. Despite the development and widespread use of PowerPoint in teaching, teaching effect of it has been questioned by the experts of educational technology worldwide. That is, some support comprehensive use of it, some believe in the limited and organized use of it and not using it have been recommended by some others. Studies on the frequency, type and effectiveness of PowerPoint slides in teaching have been a few and the results were paradoxical. In a research based on an experience in a class, teaching through PowerPoint was not something more than an interesting hobby and even the use of this technology has not led to greater participation of students in the class.<sup>3</sup>

On the other hand, it must be admitted that the use of PowerPoint is like an alternative to the chalk and board-based methods and looking at this aspect of it has led to neglecting the various facilities and advantages of it.<sup>4</sup> Thus, in recent decades, revising traditional methods of teaching and the use of new, active and student-centered

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learning methods have been felt by teaching systems and the application of these techniques has been common in various sciences including medical sciences.<sup>2</sup>

So far, the major topics in the curriculum of pharmacology in Tabriz University of Medical Sciences were taught through PowerPoint and lecturing. The varieties and similarities in drug names, their applications, mechanism of action and side effects of medicines and the like make an effective learning difficult and lead to forgetting the taught contents. So far, the use of current methods (lecturing and PowerPoint teaching methods) has not been well able to fix this problem. Obviously, the use of more effective methods of teaching can be helpful in promoting it. Necessity of applying such methods indicates that there are some problems in using current methods considering the students' opinions throughout the many years of training experience as well. The aim of this comparative study was to examine the effects of the three teaching tools including PowerPoint, whiteboard and observing dosage forms closely in the course of Pharmacology and using the results to select the best available teaching method to teach this important lesson in the future.

## Methods

In this study, the participants were all the undergraduate students of Health Care Management in term 5 (30) and Family Health in term 3 (26) during the first semester of the academic year 2008-2009, Faculty of Health and Nutrition, Tabriz University of Medical Sciences. A two-credit Pharmacology course was scheduled based on the course outline in 16 two-hour sessions during the semester and were taught by the same instructor. This study was planned to make the comparative review of three different methods of teaching pharmacology: using PowerPoint, whiteboard and observing dosage forms. Thus, half of the training sessions at the beginning of the course was held using PowerPoint presentations and lecturing without using whiteboard and absence of dosage forms and the second half of the training sessions was held without the use of PowerPoint but whiteboard and showing the teaching pharmaceutical forms to students in every session, observing practically and describing the labels of any dosage form. The teaching also included: showing the modules in the packages of liquid dosage forms and explaining the correct use of them, how to make antibiotic suspensions scientifically correct using a powder dosage form, showing how to use dosage forms including eye drops and ointments, nasal and oral sprays, ear drops and expressing other essential information about them such as how to keep drugs at home or in health centers.

In order to obtain the views of students about the effects of each teaching method and also to determine their level of learning, the researchers used self-assessment method, and a researcher-prepared questionnaire was given to each student at the end of the semester. It was a five-item questionnaire containing 12 questions.

Five-item Likert scale from very low to very high was used to calculate the scores of the attitudes and the range of scores was from zero to 100. Two open questions were also posed in the questionnaire. The validity of the questionnaire was determined through reviewing the literature and obtaining the experts' theories, and

its reliability measured by Cronbach's alpha and alpha coefficient was  $\alpha=0.77$  which demonstrated good reliability of the questions. The data obtained from questionnaires completed by students were analyzed using SPSS and descriptive statistical parameters. To summarize the data, the researchers used descriptive parameters including mean and standard deviation. Considering ethical issues, writing the name in the questionnaire was optional. All the completed questionnaires and the students' opinions were kept confidential.

## Results

The students studying in the field of Healthcare Management (30) and Family Health (26) participated in this study. The results of each field have been expressed separately as follows:

### Healthcare Management Students

The result analysis of the students' opinions in the field of Healthcare Management showed that the average of  $73\pm3.8$  % of the students found Pharmacology course important in their future job function and knowledge. One of the most important findings of this study was that the use of the dosage forms taught each session, showing them to the students, practical observing of the students and explaining the labels had an obvious effect on their learning confirmed by self-assessment results. So, as shown in figure 1, the satisfaction of the students with this teaching method was high or very high (95%).

The results of the assessment of students in this field showed that the level of the learning satisfaction in teaching pharmacology using PowerPoint as well as lecturing was 40% but the percentage was 60 for the teaching method using whiteboard.

The results also showed that the better understanding of the students through whiteboard (75%) was significantly ( $P<0.05$ ) more than PowerPoint (25%).

The Healthcare Management students believed that PowerPoint had some advantages such as getting more attention of the students, not getting bored due to not writing the content, lack of stress for the exam, suitable for the students studying the night before test and the use of resource summary. But some disadvantages were mentioned by majority of the students such as lack of concentration in class, encouraging the students to looking not learning because of the varieties of colors and forms of writing and not listening to the teaching lesson.

### Family Health Students

The result analysis of the students' opinions in the field of Family Health showed that the average of  $88\pm3.9$  % of the students found Pharmacology course important in their future job function and knowledge. One of the most important findings of this study was that the use of the dosage forms taught each session, showing them to the students, practical observing of the students and explaining the labels had an obvious effect on their learning confirmed by self-assessment results. So that the satisfaction of the students with this teaching method (figure 2) was high or very high (95%).

The results of the assessment of students in this field showed that the level of the learning satisfaction in teaching pharmacology using PowerPoint as well as lecturing was 35% but the percentage was 65 for the teaching method using whiteboard.

As shown in figure 3 the results also showed that the better understanding of the students through whiteboard (80%) was significantly ( $P < 0.01$ ) more than PowerPoint (20%).

Like the Healthcare Management students, the students of this field also believed that PowerPoint had some advantages such as identification of course structure, getting more attention of the students, not getting bored due to not writing the content, lack of stress for the exam, using images to help learning and the use of resource summary. But some disadvantages were mentioned by majority of the students such as lack of concentration in class, exhaustion and frustration of the students.

The students of this field also believed that PowerPoint had some advantages such as identification of course structure including the summary of the contents, better and faster learning and more concentration, learning the name of the drugs not understood correctly through teaching, helping to keep the taught contents in mind, learning better because of the images and animations in the slides facilitating the learning. However, majority of the students mentioned some disadvantages such as less attention to the trainer's explanation because of more attention to the slides, monotonous for the eyes and attracted by the slides without regard to its content. They believed that using whiteboard in teaching could lessen the monotony of the class and drawing diagrams or writing some of the content tree on the board could help to deep learning, better understanding and memorizing of the materials.

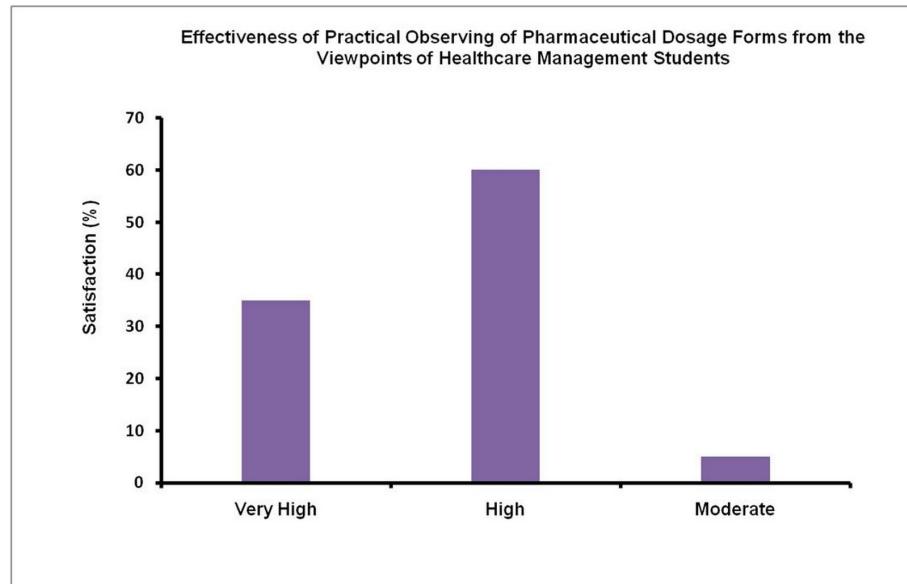
## Discussion

This study aimed to determine the satisfaction of students of Healthcare Management and Family Health with the teaching method of pharmacology course through observing the teaching dosage forms in each session and showing them to the students and practical observing and comparing them with the established methods and to determine the students' level of learning in pharmacology course using PowerPoint and whiteboard through the students' self-assessment.

As mentioned, pharmacology is one of the important and specific courses of the Healthcare Management and Family Health students. So far, the major topics in the curriculum for students of Pharmacy in Tabriz University of Medical Sciences were taught through PowerPoint and lecturing. Due to the theoretical nature of the course and various similarities in the contents of it including drug names, side effects of medicines and the like make it difficult to learn and memorize the contents. Up to now, the use of established methods (lecturing and PowerPoint teaching methods) has not been well able to fix this problem.

In this study, the participants were all the undergraduate students of Healthcare Management in term 5 and Family Health in term 3 during the first semester of the academic year 2008-2009, Faculty of Health and Nutrition, Tabriz University of Medical Sciences. The students of Healthcare Management and Family Health found teaching pharmacology effective through showing dosage forms (95%).

Although lecturing is one of the most widely used teaching methods in teaching of this course and it seems the proper method for providing information, this method is not provided with the chance of thinking and deep learning essential for learning.<sup>2</sup> The participated students in this study found lecturing without using training aids basically



**Figure 1.** Percentage of healthcare management students' satisfaction on the effectiveness of practical observation of pharmaceutical dosage forms in the course of pharmacology.

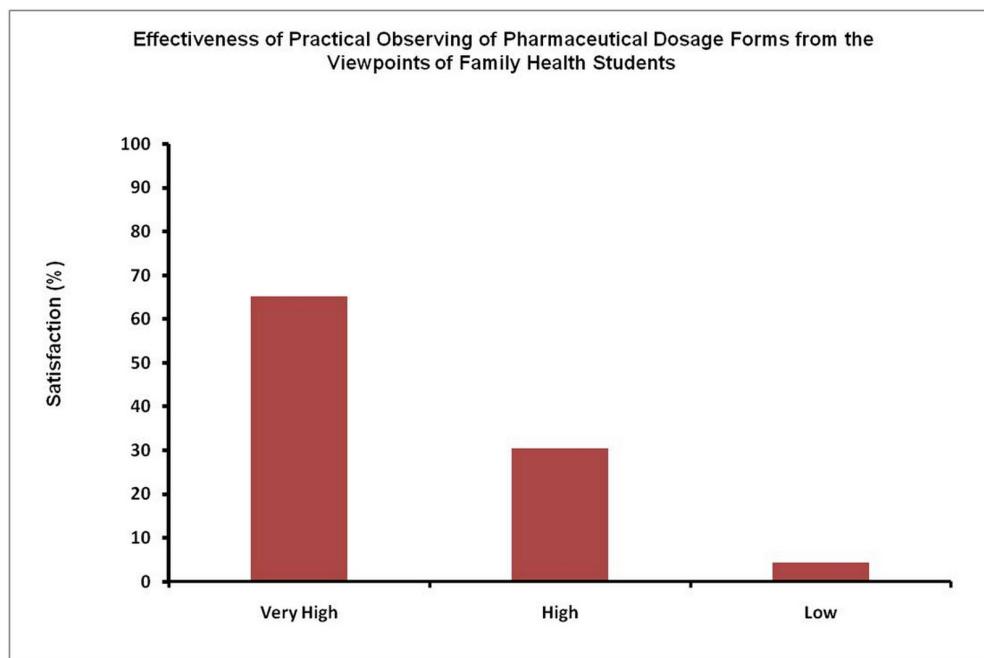


Figure 2. Percentage of family health students' satisfaction on the effectiveness of practical observation of pharmaceutical dosage forms in the course of pharmacology.

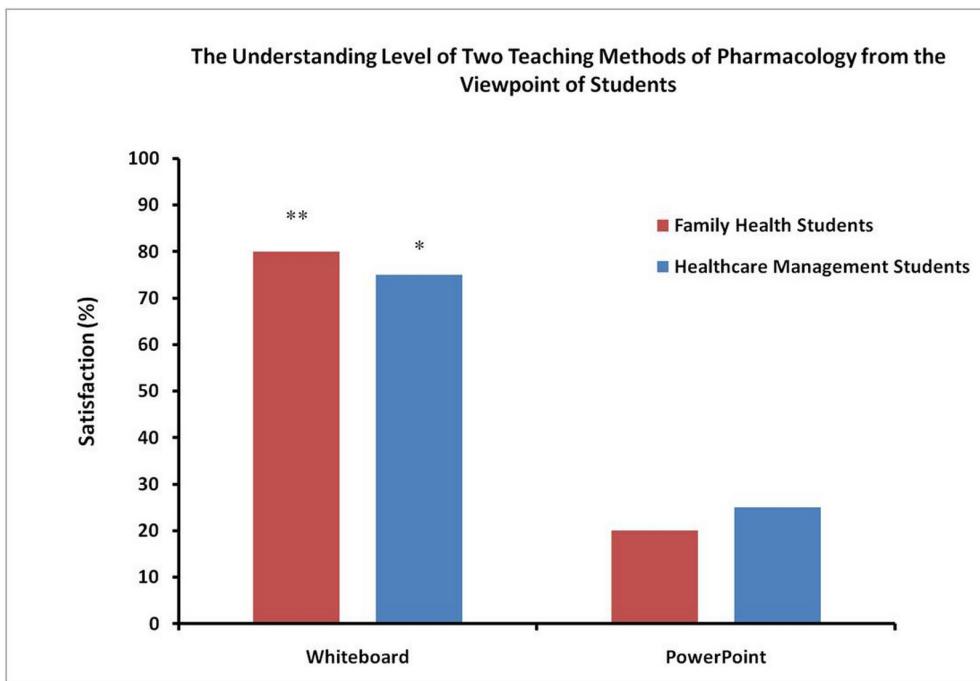


Figure 3. Percentage of healthcare management and family health students' satisfaction on the understanding level of Whiteboard and PowerPoint in the course of pharmacology. \*\*  $P<0.01$  and \*  $P<0.05$  versus PowerPoint method.

useless.

Even though traditional methods of teaching pharmacology are cheaper and easier for faculty members, they must not limit their teaching to theoretical concepts but with different methods of teaching they must motivate students to develop their learning. On the other hand, students should also be asked about their teaching method and they have to use the students' self-assessment results for increasing their ability.<sup>5</sup>

The present study showed that the students of both fields

of study believed that the level of the learning would be outstanding if the teaching were accompanied with demonstrating the dosage forms because the students would keep contents in their mind the best through observing dosage forms and reading the labels on the drugs, on the other hand, learning pharmacology would not be boring for student.

In the present study, low student satisfaction with training aid device returns to PowerPoint compared with other methods, particularly whiteboard and the present results

indicate that, despite the wide use of PowerPoint in teaching academic courses, this training aid could not be successful in education as it should be and whiteboard is considered a serious rival despite its use for decades. The study, based on the experience gained from a class, done by Blokzijl et al in Delft University, Netherland indicated that PowerPoint presentation was something like an interesting entertainment and even the use of this technology has not led to greater participation of students in the class either.<sup>6</sup>

Of course there would have been a low moderate satisfaction with PowerPoint from students' point of view if the slides had been at their disposal which could have some advantages such as lack of stress for test materials, not taking note during training course and the effect of images. Despite this fact, the majority of students would prefer to use a whiteboard and this satisfaction is due to the high level of students' understanding by this method compared with others including PowerPoint ( $P=0.001$ ). It seems interesting that we always think that the newer and more advanced training tools can be more effective in promoting learning. However, the results of this study demonstrated that older methods such as whiteboard, if used effectively, could still have a good power of understanding. But due to the lack of teaching materials, the summary writing for slow students can be considered as the disadvantage of this method. Although the students admitted using academic reference introduced by a professor was a proper method for studying, it is not actually possible for students to study all the introduced references because of having lots of courses each semester so that having educational pamphlet or PowerPoint slides could solve this problem.

### Conclusion

Healthcare Management and Family Health students in Tabriz University of Medical Sciences believe that the level of the learning pharmacology through using whiteboard along with observing the dosage forms appropriate to each training session is outstanding.

### Competing interests

None to be declared.

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