Effect of Group Investigation Model on Drug Interaction Materials to Learning Outcomes in the Subject of Therapy Concept for Pharmacy Students

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Abstract

Conventional learning through lecturing decreases students' involvement whereas students' active participation in class promises more benefits. The development of active learning method can help hone students' soft skills in thinking critically and systematically.This study aimed to identify the effect of applying group investigation methods on drug interaction materials to learning outcomes in the subject of therapy concept. Students' response towards the group investigation method would also be described.The study used a quasi-experimental quantitative approach with a non-equivalent control group design involving 4 classes of fourth-semester pharmacy students during June 2016. Students were divided into 2 control groups (139 students) and 2 intervention groups (141 students). Learning outcome was assessed based on the average pre-test and post-test score and pass rate of all students. To identify students' response towards the learning process using group investigation method, a questionnaire adopted from other studies was utilized.

There was an improvement in post-test scores of intervention group (58.8 to 72.23) when compared to the post-test scores of control group (53.76 to 57.93) The students also indicated positive responses to the implementation of group investigation method, reaching 70.33%. Group investigation method learning could improve students' learning outcome in subject of therapy concept.

Keywords: pharmacy, group investigation, concept of therapy

Introduction

Advancement in the field of health sciences and the paradigm shift the role of pharmacist from drug oriented to patient oriented demands preparation of pharmaceutical knowledge that many of them in terms of pharmaceutical services. The demands of society as well as other health workers on the role of pharmacists have experienced a significant increase primarily related to the need for rational drug therapy. One of the branches of pharmacy that supports pharmacy competence in

implementing pharmaceutical care is pharmacotherapy which has also been established by Association of Indonesian Pharmacy College (APTFI) and Indonesian Pharmacists Association (IAI) as compulsory subject in core curriculum of pharmacy. One of the supporting courses in studying and understanding pharmacotherapy is the concept of therapy.

The concept of therapy is one of the subjects of competence and the basis of understanding in providing pharmacotherapy services in the field of clinical pharmacy. This course becomes the beginning of the formation of an understanding in pharmacotherapy that combines understanding of principles in therapeutic treatment with human physiology. The establishment of an understanding in pharmacotherapy is necessary in this course considering that this course is a basic understanding to understand the pharmacotherapy course series in the pharmacy department at the Universitas Islam Indonesia.The materials in this subject require many students to be able to construct their understanding, one of them is the material about drug interaction, because many use the concept, so that if students do not understand it will be difficult to understand the material from concept therapy and pharmacotherapy.Cases of drug interactions are common cases in patients. the overall prevalence of drug interactions is 50% to 60% (Syamsudin, 2013). Occurrence Drug interactions can result in an increase or decrease in activity of a drug that can affect the body's response to treatment, so drug interactions are important to note. Therefore a pharmacist needs to have practical knowledge about drug interactions.

Materials about drug interactions are given after midterm exam. The learning process that has been done on the lecture of previous therapy concept is conventional recovery with lecture method. Efforts to improve the quality of learning have been pursued through the use of video in lectures for several topics and received a positive response from students. In general, the final average score in the academic year 2014/2015 is 64.03. The results of the middle of the semester test is actually quite good with an average score of 71.63, but on the final exam of the semester the average score is only 53.76. Characteristics about semester test more test the student

memorization, while the matter of final examination of semester more test ability of student in facing case which require existence of understanding and analysis. Given his position as a compulsory subject of competence with a minimum passing grade C of course this will greatly affect the achievement of the target of graduation students on time.The identification of the student condition indicates that the student has good memory ability, but has not been able to apply it in the case so that it has difficulty in doing exam questions that require analytical thinking ability; students only learn the material received and tend to be passive shown by the least number of students who asked when the lecture took place. Based on this, it can be concluded that the ability of students to analyze problems and critical thinking is still lacking. This shows the gap between the learning outcomes and the expected competencies of the curriculum applied in the Pharmacy department. Therefore, it is necessary to develop a learning method that can improve students' soft skills to analyze problems and think critically. Understanding the above problems, researchers trying to find a model of learning that feels appropriate for the course of the concept of therapy so that students can understand the concept thoroughly which will ultimately be able to improve learning outcomes. Learning model that will be applied is model study group investigation. A study shows that the application of an investigative group model can improve students' mathematics learning outcomes (Astuti, 2014). The group investigation learning model is a learning model that involves the students actively in their learning, because the learning model demands the participation of each group member in an investigation (Suprijono, 2009). Thus, in groups, students must be able to think and act creatively, because students must find the answers of each defined learning objectives (Slavin, 2005). In this learning model, students are expected to understand the study of the material so that students can understand the concept in the basic determination of therapy for patients.

Methods

Participants

Two hundred and eighty fourthyear pharmacy students participated in this study. It was conducted in the academic year 2014/2015. Students were divided into 2 groups (2 classes of control group and 2 classes intervention group), the determination of the control group and the intervention was based on a simple draw conducted by the researcher. The willingness of the students to be involved in this research is indicated by the filling of informed concent. Each class was devided into 8 small groups that consisted six to eight members per group. The students were divided into heterogeneous groups, based on academic strengths and weaknesses.

Procedures

The study used a quasi-experimental quantitative approach with a non-equivalent control group design involving 4 classes of fourth-semester pharmacy students during June 2016. During the implementation of the group investigation method, all students did the pre-test about drug interaction material. The post-test were administered immediately at the end of the treatment. Student learning outcomes are assessed from the post-test results, where the post-test results are similar to the final exam results of the semester.

Each group got group worksheets on different topics. these topics are risk factors of drug interactions; pharmaceutical interactions; interaction in the absorption phase; distribution phase; metabolic phase; excretion phase; pharmacodynamic interactions; drug interactions against disease.Each group investigated through literature searches to answer questions on group worksheets. The time allocation for the investigation is two hours. Each group will be accompanied by one tutor, where the tutor is tasked with observing and assessing the cooperative attitude of the student during the investigation process. Tutors are students who have graduated pharmacy graduates. At the next meeting, each group presented the results of his investigation to other students. Meanwhile, for the control group, the lecturing process uses conventional method where the material about drug interaction is given directly by the lecturer.

Results and Discussion

The effectiveness of the application of investigative group methods is seen from the improvement of student learning outcomes. The improvement of students' learning outcomes is the increase in the average score of the students to reach more than 65 and graduation rates of over 90%. The component of assessment on therapeutic concept course with investigative group method includes assessment of hard skill and soft skills. Assessment of hard skill seen from student's cognitive ability is the acquisition of comparative values of pre-test and post-test the value of the concept of therapy. The soft skill assessment includes an assessment of the cooperative attitude assessed by the tutor. The assessment of all indicators of teaching grants performance is as follows:

a.   Test Formatif Pre-Post Test

Formative testing is done to see the effect of applying group investigation on student learning outcomes. Pretest data is the data obtained to measure students' initial ability in both groups. Posttest data was performed to find out student learning outcomes in both groups ie intervention class and control after both of them were given treatment.
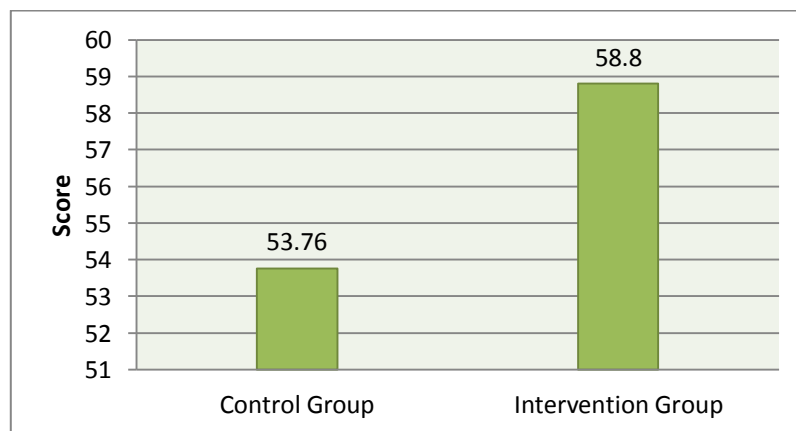

Fig. 1. The average comparison of pre-test scores in the control group and the intervention group

The pre-test results showed that the two groups had not much different initial values. Obtained average on both classes averages 50 (out of 100). Based on the independent

test t-test above it is known that the sig (2-tailed) value in both groups is 0.325 (> 0.05) it can be concluded that the students' understanding at the pre-test (before the intervention) has the same or not significant.
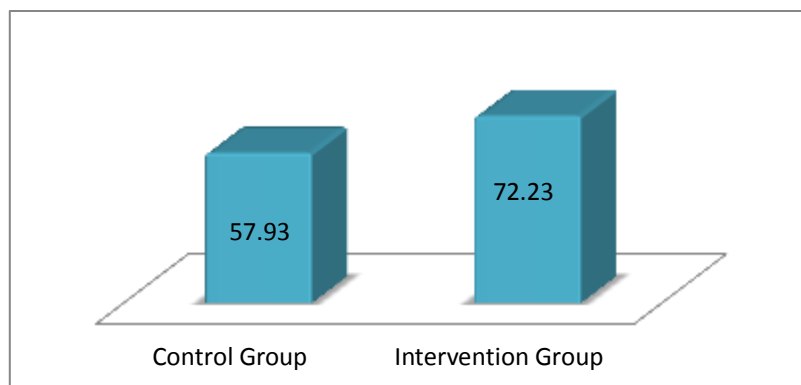

Fig. 2. The average comparison of post-test scores in the control group and the intervention group

Figure 2 showed the post-test results in both groups, each group experiencing an increase in value compared with the pre-test value. The intervention group had a greater improvement than in the control group (Figure 2). Based on the independent test t-test above it is known that the sig (2-tailed) value is 0.001 (p <0.05) it can be concluded that the use of investigative group learning strategy can improve the learning outcomes for the course of the concept of therapy in pharmacy students. This can happen because the investigative group model can increase students' motivation to learn and find answers to the problems that the student is getting. A study of students in Singapore found that the implementation of the investigative group model could improve students' motivation to learn but (Chin Tan et al, 2007).
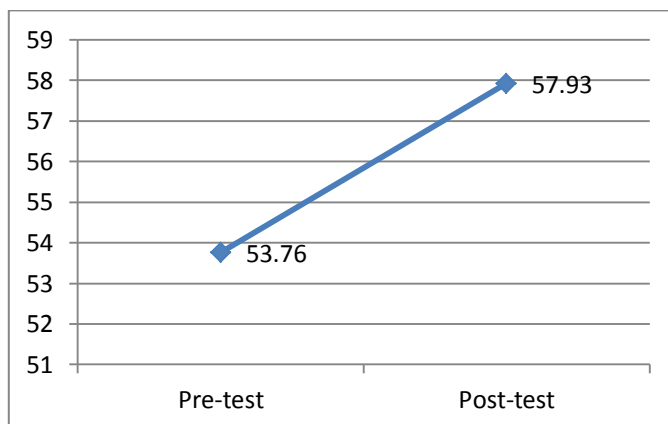
Fig. 3. Comparison of Mean Pretest Posttest Score in Control Groups

Based on the result of paired t-test, it is known that the sig (2-tailed) value in the control group is 0.134 (p> 0.05). This shows that there is no significant difference between the pre-test and post-test results in the control group, thus there is no significant improvement in the students' understanding before and after learning using conventional methods.
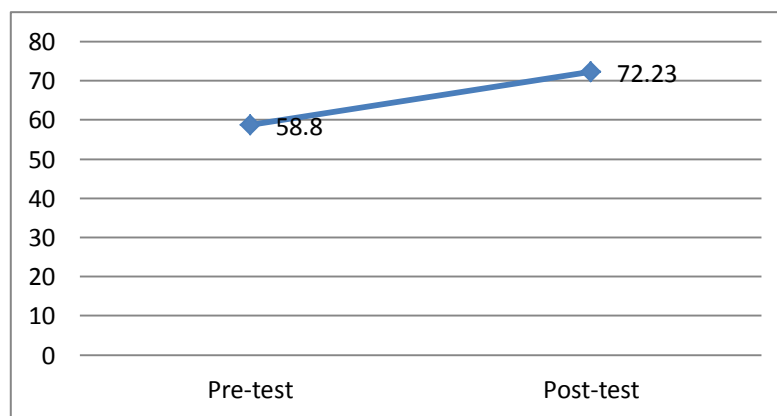

Fig. 4. Comparison of Mean Pretest Posttest Score in Intervention Group

Based on paired t testresult, it is known that the sig (2-tailed) value in the intervention group is 0.00 (<0.05) it can be concluded that there is a significant difference between the pre-test and post-test results, after learning. From Figure 3 and 4 the two groups experienced an increase in pre-test and posttest values. However, in the intervention group increased the value of larger than the control group. It shows that learning by

group investigation model is better in improving student learning outcomes compared with conventional learning. This happens because the study group investigation emphasizes more students to be directly involved in building knowledge and learn to solve every problem through search to find solutions to the problem.

The result of data analysis shows that through cooperative learning model of GI type (Group Investigation), students not only expect explanation from lecturer, but actively start from finding problem to solve problem in group. The GI type also directs students to investigate a topic by digging information from multiple sources, then presenting it in front of the class. The process of investigation requires students to be more active and able to develop their thinking skills in solving drug problems. Therefore, students' inquiry skills have been trained in group learning activities by providing problems regarding drug interactions.

b. Cooperative attitude assessment is done during the presentation process

It aims to evaluate students' skill of soft skill. The softskill assessment rubric is adapted from the literature "Cooperative Learning: Theory and Application of Paikem". Cooperative attitude assesses several aspects such as communication skills, creativity, ability to appreciate the opinions of others and work in teams. Scale rating from 0 to 100 but will be converted to 0-10. The higher the value of cooperative attitude the better the student's softskill. Meanwhile, the assessment of the content of the presentation materials becomes part of the assessment of group tasks. The results of the softskill evaluation are shown in Table 1.

Table 1. Comparison of Cooperative Attitude Score Concept Therapy Course in Control and Intervention Groups

Group	Cooperative Attitude	
	Control	Intervention
	7,1	7,9

From the results obtained, both groups of both control and case groups had good softskill values and exceeded the target (>7), indicating that the students had

communication skills, creativity, the ability to respect the opinions of others well and able to work in teams.

c.   Student satisfaction level on study group investigation model

Evaluation of student satisfaction level on the application of GI learning model is seen from the result of questionnaires filled with students. From the results obtained, it can be seen that most students are satisfied with the GI method applied to the course of the concept of therapy. There are 70.33% of students who express satisfaction with this learning model. As for students who are not satisfied, argue that the method is difficult for students because they have to learn first, and prepare the lecture materials.

Conclusion

The method of learning with Group Investigation (GI) type of cooperative model is effective in improving the students' learning achievement. The improvement of students' learning outcomes is evident from the significant increase of scores between pre-test scores and post-test scores ($p < 0.05$).

Conflict of Interest

None.

Acknowledgements

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