Case-Based Method and Improvement Student's Performance on Life Cycle Nutrition Course among Nutrition Science Students

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ABSTRACT

Background : One of the skills that graduated students of nutrition science program study must possess is a higher thinking skill. These skills are needed when nutritionists overcome the nutritional problem. The study aims to analyze the effectiveness of the case-based method according to improve students' performance.

Methods : The study was class action research using quantitative study which was applied case-based method in life cycle nutrition course. This method was implemented in two classes through e-learning and online form. The samples were 92 students registered in the life cycle nutrition course. The method's effectiveness was assessed through a pre-post test, mid-semester mark, observation of students' performance during the class, and an instrument evaluation method.

Results : The post-test done after case-based method sessions showed an increasing score than pretest scores (p value < 0.05). The student's mark in the mid-test in the year 2021 for the life cycle nutrition course was also better than the mid-test in the year 2020 after using the case-based method in the learning process. Students looked like more active in participating in the CBM session than the previous learning method. It was supported by students' perception of the effectiveness of CBM activity in their learning.

Conclusions : The case-based method effectively improved students' performance, such as students' marks, active participation, and critical thinking skill in solving problems.

Keywords: Case-Based Method, Improve, Student's Performance

1. INTRODUCTION

Case-based learning has been implemented so far in medical students. Learning activities in this method are often based on case-patient being real or using human cases to impart relevance and aid in connecting theory to practice [1]. This method also focuses on improving the learning process and educating students on learning actively and independently [2]. Previous studies stated that this method could improve students' performance, such as the motivation, ability, and skills of students, including critical thinking, oral communication, and active participation in learning [3, 4]. Besides advantage for the teacher was saving time and creating dynamism and motivation among students [5].

Life cycle nutrition course is one of the main subjects which was a part of the curriculum of nutrition science in Public Health Faculty, Andalas University. This subject was taken by students in the third semester with 2 credits for theory and 1 credit for practicum. Substantially, this course provides knowledge about the role of nutrition in the life cycle, starting from pregnancy to old age, and increases students' critical thinking and problem solving skills. Besides, this course is very supportive in achieving the study program curriculum. Based on the learning results in the life cycle nutrition course, the student's mark in the odd semester of 2020/2021 was still not satisfactory because only 20% of students got B+ grades. In addition, student involvement or participation in learning was still low in asking, discussing, and answering questions.

According to the previous method and the result, we are interested in implementing the Case-Based Method (CBM) in the life cycle nutrition course to improve students' performance.

2. METHODS

The study was quantitative research categorized as class action research. The study was conducted in a life cycle nutrition subject, followed by 2 classes with 92 students of nutrition program study, public health faculty, Andalas University. The case-based method

was applied online through e-learning of public health faculty, Andalas University, and zoom meeting media because the pandemic coronavirus disease 2019 or COVID-19 situation was still happening. The CBM session was implemented in three meetings, in the fifth until the seventh meeting before the mid-semester test. The other meeting was applied conventional method which students with group prepared material and PowerPoint to present and discuss in the class or meeting.

Students were divided into 10 groups, and each group consisted of 3 or 4 students. Before doing online meeting , all materials, such as scenario, technical rule, and materials regarding the class, were input in the e-learning of pubic health faculty. All learning materials were communicated and discussed by all the lecturers included in the subject, then approved by the coordinator of study program. Students must already register in e-learning to access and learn all materials before discussing them in the CBM session.

The CBM session was undertaken after getting permission from the coordinator of study program. The class was taken into one (1) hour 40 minutes, and all meetings using zoom media. The time distribution for each meeting consisted of explanation, discussion, and preparation of presentation in break out room, presentation, discussion in the main room, and conclusion. We conducted pre and post-test before discussion in the break out room to know the effectiveness of the case-based method in improving students' knowledge about materials. The test is consists of 10 questions and was conducted online through a google form.

At the end of the class, we distributed the online questionnaire by google form to evaluate CBM through students' perception about the effectiveness of CBM activity in their learning [3]. This questionnaire consisted of 13 questions that we validated on the program study to the lecturers. Students' perception is categorized into 5 groups Likert Scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree). Observation by lecturer or facilitator was also undertaken to assess students' performance during CBM sessions, such as active participation, oral communication, and interaction with other students. We used a rubric in evaluating the student's performance and evaluation from each student about the contribution of each member during CBM session or peer feedback [6]. The evaluation of the CBM was also assessed through the mid-term score test and then compared with the mid-term score test last academic.

Data of the study were presented descriptively, such as percentage, and also done the statistic test to know the effectiveness of the method with using paired t-test. The significance of the test was determined by p value less than 0,05.

3. RESULTS

A total of 92 students from the nutrition science study program registered in the life cycle nutrition course participated in the study. A case-based method implemented online using e-learning and zoom meeting. Before and after the CBM session, we distributed online tests to the students using google form to know the effectiveness of CBM in improving students' knowledge. In the study, we only conducted successfully pre-post test for breastfeeding nutrition material because of technical problems using online procedure. From the test, we found an increase in the pre and post-test scores of students in this session (45.16 scores versus 84.19 scores)(Figure 1). The paired t-test between pretest and post-test scores were statistically significant with p-value < 0.05 (p-value = 0.0001).
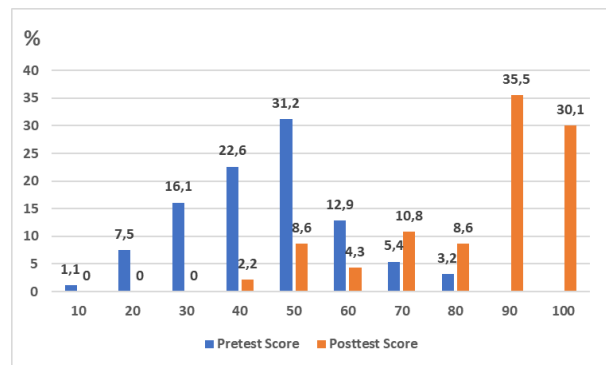

Figure 1. Pretest and Posttest Scores of CBM Session

Evaluation of the implementation of CBM was conducted through mid-semester test. Then we compared the student's mid-term test year 2021 with the student's mark of mid-term test year 2020 to analyze the effectiveness of the CBM in the life cycle nutrition course (Figure 2). We can see that there is an improvement of student's score above 65 point category, especially on score 80 point (17.4 % in year 2021 versus 2.9% in the year 2020).
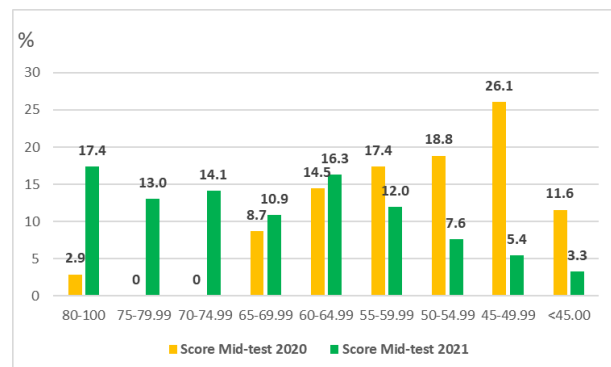

Figure 2. Student's Score on Mid-test year 2020 and Mid-test year 2021

The student's perception of the effectiveness of CBM on improving students' performance was assessed

from the questionnaires using 5 points Likert scale. Overall, the students reported satisfaction with using the CBM in the life cycle nutrition subject (more than 80% agreed and strongly agreed to category). Specifically, more than 90% of the students stated that CBM could motivate them to learn better (60.7% agree and 32.6% strongly agree), communicate orally better (55.1% agree and 38.2% strongly agree), and help in getting learning experiences (55.15 agree and 39.3% strongly agree). Many students agreed that CBM sessions could increase critical thinking and problem solving ability (51.75 agree and 46.1% strongly agree). Students agree that CBM could improve their skills. For Example, the interaction with other students (50.6% agree and 44.9% strongly agree), develop writing skills (50.6% agree and 20.2% strongly agree), do active participation in understanding the material (55.1% agree and 38.2% strongly agree) and help them to focus and better understanding in concept (67.4% agree and 18% strongly agree).
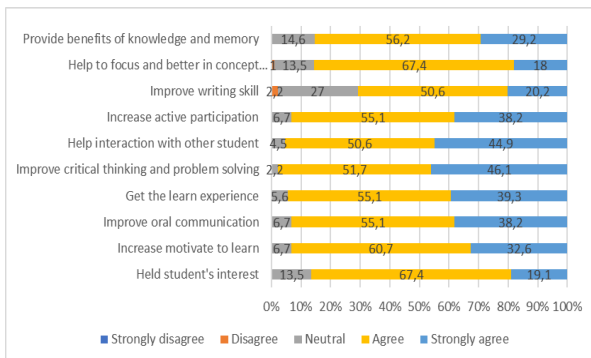

Figure 3. Student's Perception on Effectiveness of CBM Activity

4. DISCUSSIONS

The present study shows a significant improvement in students' performance following the CBM session. It is shown from the score of pre and post-tests, students' marks from mid-test, and active participation during CBM session. There is an increase of scores from pre and post-test for one material, exactly breastfeeding nutrition topic. According to the student's perception about the CBM session, they give a good response for implementing this method. Specifically, the students are more interested and better motivated to follow the class, get more experience in learning, improve oral, critical thinking, and solve problems. Besides that, they opined that the CBM session also helps them interact with other students. The lecturer's observation supported their perception during the CBM session. They were more active in group discussions to understand the case or scenario, participate in giving an opinion, and be enthusiastic in presenting their work. From each group presentation, the lecturer could see the students' critical thinking and how they created the learning outcome of the meeting.

Davide Giacalone (2016) supported the study, which stated that the case-based method provided students with the opportunity to apply their knowledge and analytical skills to complex, real-life scenarios relevant to the subject matter. The findings were consistent with Mathews Nkhoma et al. study (2017) by using three cohorts of undergraduate students of the same course. This indicated that interaction with peers and lecturers during the class discussion improved emotional engagement [7 8]. This situation was in turn positively influenced positive group interaction and individual learning performance. The study also found that students' emotional engagement was a significant factor in enriching outcomes. Other findings positively correlated to increased student perceptions of learning gains through case studies associated with oral and written communication skills and the ability to recognize connections between biological concepts and other aspects of life [9]. The previous study identified that students' satisfaction with CBM was significantly higher than that of the lecture method. This method motivated the students to get a learning experience and create an atmosphere during the CBM session was more dynamism, more lasting learning, and not being tedious [5].

However, the learning process was carried out in the pandemic COVID-19 condition so that CBM sessions still used online settings or the internet. We know that there is a limitation in using the online setting on learning. The learning can run smoothly depending on all students' access to the internet. Not all the students have an excellent economic according to fulfill the internet needed during learning, besides the location of the student's living and the weather is also contributed on good internet access. We could see the disadvantages of this form when we evaluated the method through google form and during the implementation. The present study is also the same result as previous studies regarding using online settings in learning. They found that online learning needed a good internet access or a stable internet network to get optimal results in implementing the certain method besides the lecturer's skills in using media internet. The lack of internet connection and the unequal quality of internet services causes the students to feel it is difficult if they always have to be online based or remind them to focus during learning [10, 11].

The challenge of applied CBM is when using this method in a large class setting. The present study also faced this condition. The facilitator or instructor must pay attention to how the students engage in the case discussion. In the following semester, we hope the CBM could be implemented in face-to-face learning and the life cycle nutrition course and the others course.

5. CONCLUSION

The case-based method could effectively improve students' performance, such as active participation, critical thinking, and score. Because of that, it should be implemented this method in the other course.

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