

ONLINE LECTURE DURING THE COVID-19 PANDEMIC AFFECTS MEDICAL STUDENTS' LEARNING OUTCOMES BASED ON MCQ SCORE EXAMINATION

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ABSTRACT

The COVID-19 pandemic has made major changes, one of which is the policy of implementing online lectures from home. This change in method can affect student learning outcomes that can be observed through the results of the MCQ exam at the end of the block. This study was conducted to determine the influence of online lectures during the COVID-19 pandemic on the results of the final MCQ test of student blocks. The retrospective cohort research design was carried out by collecting the MCQ scores at the end of the block at the time before the pandemic, the beginning of the pandemic and the sixth month of the pandemic from students of the 2017, 2018, and 2019 batches and data analysis was carried out by means of the Friedman Test, the Repeated Anova test, the Kruskal-Wallis test and the One-Way Anova. In the class of 2017, the average MCQ test results of the final block before, at the beginning, and in the sixth month of the pandemic were 50.72+8.02 consecutively; 51,39+6,8; 50.31+8.41, and there was no significant difference between them ($p>0.001$). Meanwhile, in other batches, a significant difference ($p<0.001$) was found with the results of the final MCQ exam in the 2018 batch of 45.29 + 7.87; 42.77 + 10.4 and 50.68 + 10.63 and for the class of 2019 it is 62.00 + 6.83; 46.8+10.92 and 52.32+10.02. At the beginning of the implementation of online lectures, the final MCQ score of the junior student block was most affected ($p<0.001$). The online lecture method affects the learning outcomes of first- and second-year students but not for third-year students.

Keywords: *online learning, pandemic, covid-19, MCQ test*

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Introduction

Currently, the world is still facing the COVID-19 pandemic, which was first discovered in Wuhan at the end of 2019 and announced by the WHO. The COVID-19 pandemic has not only had a major impact on the health sector but all sectors of life, including the education sector.¹ The learning process that usually occurs face-to-face eventually must change the method to be online. This of course also has an impact on the readiness of the community and educational institutions to adapt to these changes. So far, the online learning process has been used as a supporting method, but with the pandemic conditions, the online method has become more dominant.²

The first case of COVID-19 infection was found in Indonesia in March 2020 and finally the government recommended all levels of education to replace the face-to-face learning process to online, including medical education. This of course raises challenges, including adapting the use of technology from both teaching staff and students, communication and interaction being not optimal, obstacles from the internet network itself.^{2,3} In addition, challenges do not only occur in the learning process but also in evaluating learning outcomes.

The Faculty of Medicine, Muhammadiyah University of Palembang (FK UMP) also made adaptations to deal with the COVID-19 pandemic. All learning methods such as integrated lectures, tutorials, Clinical Skills Training (LKK) as well as practicum and professional introduction assignments are carried out remotely online. This also happened in the block final exam process, namely the *Multiple Choice Question* (MCQ) exam, *Objective Student Oral Case Analysis* (OSOCA), *Objective Structured Practical Examination* (OSPE) and LKK exams. These changes certainly have an

impact on student learning outcomes, but for almost 3 years experiencing a pandemic and making adaptations, no research has ever been conducted on the impact of a pandemic on student learning outcomes. The purpose of this study was to determine the impact of online lectures during the pandemic on the results of Multiple-Choice Question (MCQ) test as the final block examination. The lecture method was chosen because until this research was carried out the lecture process was still carried out online and the MCQ test was chosen because it had the largest percentage weight in the block learning evaluation method at FK UMP.⁴ In addition, the MCQ test is an assessment that can be used to test students' insight on several topics in a short time in an efficient way because it covers a broad content and has a high level of objectivity and is easy to analyze and report on the results.⁵

Method

This research used quantitative method with comparison analysis to the results of MCQ test of final block examination years 2017, 2018 and 2019 students (290 in total) from 3 block that were doing at that time. The blocks that opted in analysis were blocks with offline studying (before pandemic) and online studying (at the beginning and sixth month of pandemic) and each block owns the same credits. At the early pandemic, online lecture using google classroom was applied to students while zoom meeting was used for online lecture at the sixth month of pandemic. During the pandemic, MCQ final test was done online. Comparison analysis test (Friedman test, Repeated-Anova test, Kruskal-Wallis test and One-Way Anova; significant if $p < 0.05$) were done on each years and between the students of different years.

Result

There was no difference in the mean of the results of MCQ test before pandemic and during pandemic for student years 2017 ($p=0.085$). For the students of years 2018 and 2019 experienced drop of the test on beginning of pandemic however they go on return on month sixth of pandemic . Results analysis show there was no difference which mean mark mcq test before and during pandemic for students years 2018 and 2019 ($p<0.001$, $p<0.001$, respectively) (table 1). Post hoc test show that there was significant difference of MCQ test before , beginning , and month sixth pandemic for years 2018 and 2019 (table 2 & table 3).

Table 1. Comparison of MCQ test before , beginning and month sixth of pandemic

Stude nt Years	MCQ test result			p
	Before pande mic (μ (SD))	Beginn ing of pande mic (μ (SD))	Sixth month of pande mic (μ (SD))	
2017	50.72 (8.02)	51.39 (6.80)	50.31 (8.41)	0.08 5
2018	45.29 (7.87)	42.76 (10.39)	50.68 (10.63)	<0.0 01
2019	62.00 (6.83)	46.80 (10.92)	52.32 (10.02)	<0.0 01

Table 2. Post-hoc analysis of MCQ test for students years 2018

	Difference of mean	p
Before vs beginning of pandemic	2.98	0.001
Before vs month sixth of pandemic	4.88	<0.001
Beginning vs month sixth of pandemic	7.85	<0.001

Table 3. Post-hoc analysis of MCQ test for students years 2019

	Difference of mean	p
Before vs beginning of pandemic	15.2	<0.001
Before vs month sixth of pandemic	9.68	<0.001
Beginning vs month sixth of pandemic	5.52	<0.001

On the beginning of pandemic , the result of MCQ test for lower grade students (years 2018 & 2019) were lower than higher grade (years 2017) ($p<0.001$). However on month sixth of pandemic , there was no difference for mean of them all ($p=0.644$) (table 4).

Table 4. Comparison of MCQ test before, beginning and sixth month of pandemic between years.

	MCQ test results			p
	2017 (μ (S D))	2018 (μ (SD))	2019 (μ (SD))	
Beginning of pandemic	51.39 (6.80)	42.76 (10.39)	46.80 (10.92)	<0.0 01
Sixth month of pandemic	50.31 (8.41)	50.68 (10.63)	52.32 (10.02)	0.64 4

Discussion

Education at the medical faculty is known to be quite dense and tends to cause stress for students. The ability of students to be able to adapt in education is important and supports the learning process.^{6,7} According to research conducted on Ubaya Medical Faculty students in 2021, it showed that the academic achievement of medical faculty students between the first and second years had no difference, so it can be said that 1 year is not enough for students to adapt to medical school education.⁶ The change in learning process and evaluation methods from offline to online during a pandemic certainly requires adaptation from students in each class. Junior students

have just graduated from high school and have just adapted to learning methods in college, while senior students have taken longer (more than 1 year) to adapt to changes in learning methods so that it can be said that junior students are making stronger efforts to adapt in the world pandemic period compared to senior students and affect their academic achievement. We can relate this to the results of this study which states that p value in beginning pandemic, where study online first started, the mark of mcq end block for college student juniors (force 2018 & 2019) lower than college student senior (force 2017) ($p < 0.001$) on month sixth pandemic, there is no difference for mean mark of mcq end block on three force college student ($p = 0.644$). This is also related to students' readiness for independent study that first-year medical students have a low level of independent learning ability, but second and third year medical students have a good level of independent learning ability.⁸ However, the results of this study show that there is no difference between the first and second years' results. This might be because, at FK UMP, the second year students are also still in the adaptation phase as a result of the transition of block material, and the first year students are still enrolled in the basic science block while the second year students are already enrolled in the disease system block.

In addition to adaptation factors made by students, there is an increase in stress and anxiety experienced by students when undergoing changes in learning methods during the COVID-19 pandemic.⁹ Stress and coping mechanisms during online learning are factors that can affect student academic performance. Stress is an inconvenience of mind and body that can be caused by demands and changes in human life. The inability to adapt to demands during

online learning can cause stress to students and if that happens it can cause a decrease in academic performance.^{10,11} Meanwhile, from external factors that also affect student academic performance during the pandemic, namely technical problems such as internet signals, mastery of lecturers and students on technology, involvement and interaction of students and lecturers during the online learning process, time management during online learning also has an impact on student learning outcomes in times of pandemic.^{2,3,12,13,14} Several research results show that distance learning methods are considered less effective and efficient because they still have several obstacles in their implementation, such as internet network interference and unstable signals. The results of other studies also state that students are more comfortable doing offline lectures than online because when doing online learning, students can't understand materials and assignments that they don't understand yet, have network problems, experience eye pain because they often stare at screens, waste internet quota, have difficulty discussing with friends, so judged online lectures to be ineffective.^{14,15,16} The above factors also affect the process during the MCQ exam. The MCQ exam, which was initially conducted face-to-face, was finally conducted online. Although there is still the possibility of cheating by students, the conditions for exams that take place from home with various technical exams that minimize it (use of mirrors, two devices, mandatory room alone, supervised by more than 1 supervisor, random and time-limited questions) make students also have to be able to face challenges related to network problems and internet quotas.¹⁷ Generally, there are other factors influencing the results of multiple-choice question exams for students,

including health factors, psychological aspects, learning motivation, learning styles, and the role of instructors in delivering instructional material.^{18,19,20,21} Thus, these factors also contribute to potential biases in this research outcome.

Conclusion and Suggestion

The COVID-19 pandemic condition which required a change in learning methods from offline to online did not have a significant impact on learning outcomes for senior FK students. However, this does not apply to junior college students at the start of the pandemic. The limitation of this study is that a more in-depth analysis of the causes of the decline in learning evaluation results has not been carried out. In addition, this study did not measure the stress and anxiety scale and readiness for independent learning in students. Further research needs to be done regarding other factors that influence the results of the online final block MCQ exam, such as students' stress and anxiety levels, the readiness of the facilities and the quality of the MCQ questions themselves.

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