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Research Article

Evaluating Peer Assisted Learning (PAL) of the Online Study of Neuromusculoskeletal System Anatomy Based on the Objective Structured Practice Examination (OSPE) Scores

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Abstract.
The pandemic posed a challenge for teachers to develop new teaching methods. Peer Assisted Learning (PAL) is one of the methods. It helps the online learning process run smoothly and builds communication, interaction, and cooperation skills. This study aimed to evaluate the effectiveness of online learning methods based on pre-test and post-test scores using quantitative methods with descriptive data presentation analysis. The study population was 148 first-semester students at the Faculty of Medicine, Muhammadiyah Malang University. The pre-test and post-test results data were analyzed to determine the difference in the test scores of osteo and muscle practical exams using comparative numerical unpaired test by paired t-test or Wilcoxon test using bivariate analysis with prerequisite analysis test. The study showed an increase in the median value in the post-test osteology with a sig value of the Wilcoxon test of 0.000, which means that there was a significant difference in the pre-test osteology in the neuromusculoskeletal block. There was an increase in the average value on the post-test muscle with a sig value of 0.000 which means a significant difference in the pre-post muscle in neuromusculoskeletal blocks. The findings of this study have proven that the PAL method can support practical anatomy learning of neuromusculoskeletal blocks because it can increase the value of the Objective Structured Practice Examination (OSPE).

Keywords: anatomy, osteology, musculus, OSPE, PAL

1. INTRODUCTION

Medical education at the Medicine Faculty of Muhammadiya Malang University (FK UMM) uses the Problem-Based Learning (PBL) learning method. PBL is a method that trains students to think critically, creatively, and rationally in order to improve their understanding of the subjects so that the essential factor influences the student's activeness and independence (1). The approach strategies used in developing the PBL curriculum are student-centered, problem-based learning, integrated, community-based

learning, elective, and systematic approach (SPICES) (2). One of the primary subjects that require this approach is anatomy. Anatomy is one of the courses included in Basic Medical Sciences (IKD), where it is hoped that every medical student will be able to accept and understand an anatomical subject. Clinicians feel that teaching anatomy to medical students aims to increase students' readiness to function effectively and efficiently in clinical roles(3).

Anatomy learning, in this case, is a practical session and is still often done using the traditional method where lecturers actively provide material while students are only listeners. The activity was followed by cadaveric dissection. According to research at the J Mahathma Gandhi Institute cited by Simorangkir S (2015), this method is considered less effective (4). the limited number of Human Resources (HR) is another problem that is often encountered. It thus has encouraged the development of the anatomy practical learning method, such as the Peer Assisted Learning (PAL) method. There were many studies on the PAL method that has been widely carried out, and the results support increasing the value of participants as well as providing benefits for students who become tutors (4);(5)

The pandemic situation is also a challenge for teachers to develop learning methods. One of the advantages of using the PAL method for online learning is that it supports the learning process, communication, interaction, and collaboration (6). Online learning at Muhammadiyah Malang University was carried out using zoom media which displayed images from atlases, theories from textbooks, and our initial preparations photos. The practicum steps also remain the same, such as the pre-test before practicum, presentation of material, and identification of structures, and there is a practicum exam in the form of an Objective Structured Practical Examination (OSPE) at the end of the block.

Based on what has been described above, the researcher aimed to conduct a study and obtain more transparent and scientific conclusions. The researchers were interested in conducting a study on "Evaluation of Peer Assisted Learning (PAL) in Online Learning of Neuromusculoskeletal System Anatomy practical Based on Pre-Test and Post-Test scores."

2. MATERIALS AND METHODS

This study was an observational analytic study that used a cross-sectional approach. This study's population was all neuromusculoskeletal block one medical student in the academic year 2020-2021. The study sample was the entire population that met the inclusion criteria. The inclusion criteria in this study were medical students in the first

semester of Muhammadiyah Malang University who took the practical anatomy exam in the form of an objective Structured Practical Examination (OSPE) after this referred to as post-test on neuromusculoskeletal block 1, with the exclusion criteria being students who did not take the complete anatomy pre-test in that block.

The data collection method in this study was the documentation of the pre-test scores for the anatomy practical and scores for the anatomy practical test of neuro-musculoskeletal block 1. The data analysis used in this study was univariate, such as the data used in the form of tables and narratives, then bivariate analysis using the Wilcoxon statistical analysis test and paired t-test.

3. RESULTS

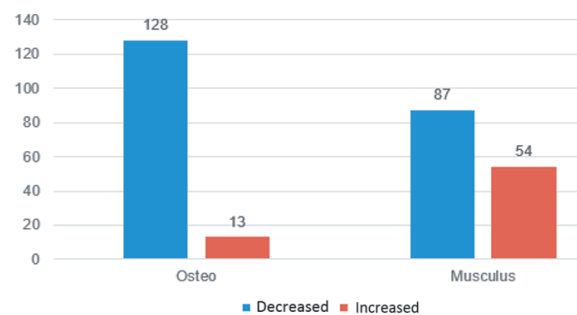### 3.1. The Average Pre-test and Post-Test (OSPE) scores Overview

Figure 1: Scatter plot between pre-test and post-test.

According to the scatter plot graph between the pre-test – post-test muscle and pre-test – post-test osteo, it is known that both graphs have a linear impression with a positive trend which means that the lower the pre-test score, the lower the NMS1 anatomical post-test score, and vice versa the higher the pre-test score, the NMS1 anatomical post-test score is also high.

The pre-test and post-test scores for osteo and muscle can be seen descriptively in the following table:

TABLE 1: Table of Descriptive Statistics.

Scores	Min	Max	Mean ± sd	IK 95%
Osteo Pre Test	0.83	80	33.09 ± 17.63	30.13 – 36.06
Osteo Post Test	4	92	51.67 ± 22.09	47.88 – 55.42
Muscle Pre Test	2.50	92.50	41.25 ± 19.08	38.16 – 44.56
Muscle Post Test	3	90	48.61 ± 19.29	45.50 – 52.19
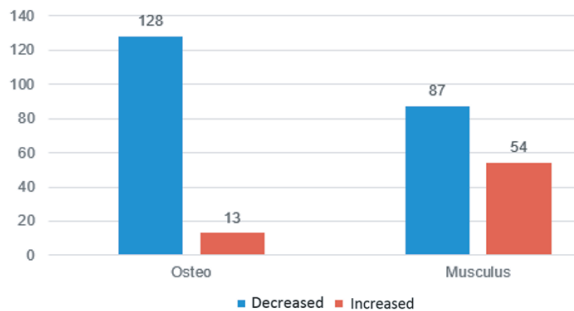
Figure 2: Comparison bar chart of the Increased number in Anatomy Pre- and Post- test Results.

It was found that there was an increase of 18.58 in the average comparison of osteo pre-post test and an increase of 7.36 in the pre-post test of muscles. The distribution of students who experienced an increase in osteo and muscle scores can be seen from the following graph:

From the graph above, it is known that the number of students in the NMS1 block who took part in the anatomy practical was 148 students, where the results of the increase in the pre-post test for osteo were 129 students, while in the muscle 87 students experienced an increase.

3.2. Comparative Test

To determine the difference in the pre-test and post-test scores for osteo and musculus, a comparative unpaired numeric test was used by using a paired t-test if normal or Wilcoxon test if it is abnormal. The results of the normality test used the Kolmogorov-Smirnov with the following results:

TABLE 2: Table of Normality Test.

Scores	Sig Kolmogorv-Smirnov	Keterangan
Pre Test Osteo	0.001	Abnormal
Pre Test Musculus	0.200	Normal
Pre Test Osteo	0.042	Abnormal
Post Test Musculus	0.200	Normal

The results of normality test showed that the osteo pre-post test data were not normally distributed (sig < 0.05) while the muscle pre-post test data were normally distributed (sig > 0.05). So that the pre-post test for osteo was done by using Wilcoxon and muscle pre-post using paired t test.

TABLE 3: Table of Wilcoxon test.

Osteo Scores	Median (min-max)	Sig
Pre Test	29.17 (0.83 − 80)	0.000
Post Test	50 (4 − 92)	

The results of the Wilcoxon test showed an increase in the median value for the osteo post-test with a 0.000 sig value of the Wilcoxon test, which means that there was a significant difference in the NMS 1 osteo pre-post-test.

TABLE 4: Table of paired t-test.

Muscle Scores	Mean ± sd	Sig
Pre Test	41.25 ± 19.08	0.000
Post Test	48.61 ± 19.29	

The paired t-test showed an increase in the average score in the post-test muscle with a sig value of 0.000, which means that there was a significant difference in the NMS 1 Muscle pre-post test.

4. DISCUSSION

Based on the study data showed that the pre-test score is linear with the post-test score, both in osteology and muscle material. This shows that whether the pre-test score is good, the post-test score will also be good, and vice versa, it can be concluded that the PAL method can support the anatomy practical learning process. The same opinion was obtained from the study at the UHKBPN Medicine Faculty in 2015 which said that PAL supports practical anatomy learning (4).

The mean value of the muscular subject pre-test was higher than that of osteology, but the post-test mean of the muscular subject was lower than that of osteology. It was the same when looking at the number of students whose grades increased in osteology material was 2.3 times more than in muscle material. As previously mentioned that there was an increase in the value of both subjects. The increase in value in osteology was greater than in muscular material. This is possible because the focus of learning is different. In osteology, focus of learning is the name of the ossa, the name of the structure and what structure it passes through, while for the muscle subject focus in the name of the region, the name of the muscle, vascularization, innervation as well as origin and insertion.

The results of this study's bivariate analysis showed that osteology and muscle subject had significant differences. It can be concluded that the online PAL learning method

helps improve the learning outcomes of anatomy practical. The same thing was found in several studies, such as by Ayu I et al (2022) who stated that the PAL method increased the value from an average of 11.17 to 13.99, although the increase was lower when compared to the conventional method (7). different things were obtained from the study of Zulvia et al (2020) which stated that there was no relationship between the PAL method and the practical anatomy value (6).

The review of the discussion above can illustrate that the acquisition of OSPE scores is not only influenced by learning methods but by several factors influence, including internal factors such as motivation, physical health, and cognitive abilities, as well as external factors, such as learning subjects, learning environment, infrastructure, human Resources. This is also stated by Wendra (2021), which concluded that it did not mean that the success of the exam depends entirely on the peer tutor (8).

5. CONCLUSION

The Peer Assisted Learning (PAL) method can support the anatomy practical learning process of a neuromusculoskeletal block because it could increase the Objective Structured Practice Examination (OSPE) scores.

Acknowledgments

References

[1] Fitriana P, Susanti E, Lisiswanti R, Soleha TU, Saputra O. Putri Fitriana Eka Susanti. Hubungan Kualitas Skenario Terhadap Keefektifan Diskusi Problem-Based Learning (PBL) Blok Emergency Pada Mahasiswa Fakultas Kedokteran Universitas Lampung Medulla. 2017;7(4)

[2] Maharani A, Laelasari L. EXPERIMENTATION OF SPICES LEARNING STRATEGIES WITH THE METHOD OF PROBLEM BASED LEARNING (PBL) TO BUILD MOTIVATION AND THE ABILITY TO THINK LOGICALLY FOR VOCATIONAL SCHOOL STUDENTS. Infinity Journal. 2017 Sep;6(2):149.

[3] Sbayeh A, Qaedi Choo MA, Quane KA, Finucane P, McGrath D, O'Flynn S, et al. Relevance of anatomy to medical education and clinical practice: perspectives of medical students, clinicians, and educators. Perspect Med Educ. 2016 Dec;5(6):338–46.

[4] Simorangkir SJ. Metode Pembelajaran Peer Assisted Learning Pada Praktikum Anatomi. Volume 58. Jurnal Pendidikan Kedokteran Indonesia Saharnauli J. Verawaty Simorangkir; 2015.

[5] Burgess A, McGregor D, Mellis C. Medical students as peer tutors: A systematic review. Volume 14. BMC Medical Education. BioMed Central Ltd.; 2014.

[6] Zulvia NT, Andrianty SN, Rahmayanti Y. PERAN PEER ASSISTED LEARNING DALAM PEMBELAJARAN PRAKTIKUM ANATOMI DI FAKULTAS KEDOKTERAN UNIVERSITAS ABULYATAMA. Jurnal Ilmu Kedokteran dan Kesehatan. 2020;7(3).

[7] Ayu I, Puspita K, Ayu P, Damayanti A, Wardani NP, Luh N, et al. PERBEDAAN ANTARA METODE PEMBELAJARAN KONVENSIONAL DAN PEER ASSISTED LEARNING (PAL) TERHADAP HASIL PEMBELAJARAN PRAKTIKUM ANATOMI PADA MAHASISWA SEMESTER I FAKULTAS KEDOKTERAN UNIVERSITAS UDAYANA. Jurnal Medika Udayana. 11(5):2022. Available from: http://ojs.unud.ac.id/index.php/eum64

[8] Wendra W. Peer Assisted Learning: Dynamics of Anatomic Learning at The Faculty of Medicine Jendral Achmad Yani University. AL-ISHLAH. Jurnal Pendidikan. 2021 Dec;13(3):2355–62.