THE EFFICACY OF ANATOMICAL SKELETAL SYSTEM GUIDEBOOK FOR MEDICAL STUDENTS AT UNIVERSITAS JAMBI

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ABSTRACT

***Background**: Medical students need to have good anatomy knowledge. FKIK UNJA changed the learning system to hybrid in response to the COVID-19 pandemic. An update on the skeletal system anatomy practicum guidebook is needed to improve student's understanding,*

***Objective**: This study aims to determine the effect of using the skeletal system anatomy practicum guidebook on the anatomy grade of first-semester students Faculty of Medicine and Health Science Jambi University.*

***Methods:** This study applied **a** quasi-experimental method with a pretest-posttest control group design. The samples were 120 first-semester Jambi University medical students year 2022/2023 who participated in the axial skeleton anatomy practicum.*

***Results:** Students with the practicum guidebook pre-test mean grades were (40,58±11,36) and post-test mean grades were (75,74±7,26). Students without practicum guidebook pre-test mean grades were (27,49±13,89) and post-test mean grades were (72,92±5,13). There was a significant difference between the students with and without the practicum guidebook (p-Grades 0,030).*

***Conclusion:** The use of the skeletal system anatomy practicum guidebook significantly improves first-semester medical students' anatomy grades.*

***Keywords:** Anatomy Grades, Complete Anatomy, Hybrid, Practicum Guidebook, Skeletal System*

INTRODUCTION

Anatomy in medical science is the main foundation, so medical students need good knowledge of anatomy to support an understanding of disease pathology and its treatment.[1,2] The Faculty of Medicine and Health Sciences of Universitas Jambi (FKIK UNJA) uses a Competency-Based Curriculum (KIPDI III) with the SPICES strategy (Student-centred, Problem-based, Integrated, Community-based, Elective/Early Clinical Exposure,

Systematic). This curriculum consists of various branches of science, of which anatomy is included in the Biomedical science department.[3] The assessment of anatomy learning outcomes at FKIK UNJA uses a summative evaluation. Summative evaluation is carried out through the practicum pre-test and post-test and Objective Structured Practical Examination (OSPE).

Anatomy learning at FKIK UNJA uses several media to support student understanding. These media include mannequins, cadaver plastination, anatomy atlas, and a practicum guidance book for each organ system.[4] The practicum guidance book is not used to replace the anatomy atlas but serves as a guide for students to understand the learning material during the practicum better.

Practicum guidance books are learning media arranged systematically, including learning objectives and materials, methods or instructions for independent learning, and practice questions to hone students' self-abilities. The anatomy practicum guidance book can be accessed anytime, provide student learning satisfaction, and increase student evaluation grades.[5,6,7]

The conditions of the COVID-19 pandemic in early 2020 have affected the anatomy learning system at FKIK UNJA.[8] Courses previously carried out conventionally or face-to-face were replaced with hybrid learning in 2022/2023. This system change resulted in the need for adjustments to the anatomical practicum guidance book, especially the skeletal system material, by adding introductory material and how to use the application Augmented Reality (AR) Complete Anatomy. The AR Complete Anatomy application was a substitute for plastinated mannequins to increase student understanding during online learning. This study aims to determine the effect of using an anatomical skeletal system practicum guidance book on the anatomical grades of FKIK UNJA first-semester students.

METHOD

This research is quantitative research using a quasi-experimental pretest-posttest control group design. The population of this study was all early semester FKIK UNJA medical students who participated in the integument system and locomotion I course (KDK113). Samples are selected using total sampling with the inclusion criteria, namely all FKIK UNJA medical students who took part in the axial skeleton anatomy practicum in the integument system and locomotion I course (KDK113). In addition, the exclusion criteria were used: students who did not participate in one of the pre-test nor post-test and students who were not willing to participate in this study.

The minimum sample size of this study is 98 samples. After meeting the inclusion and exclusion criteria, the total sample used was 120 samples. The sample was randomly divided into an experimental

group, namely students who were given the anatomical skeletal system practicum guidance book, and a control group, namely students who were not given a practicum guide. Data is collected using the pre-test and post-test grades.

Data analysis

Data were analyzed statistically with univariate analysis and bivariate analysis. Before being analyzed, a data normality test was first carried out using the Kolmogorov-Smirnov, resulting in the pre-test of both groups being normally distributed. The post-test grades of the two groups were not normally distributed. Therefore, the Wilcoxon test was used to compare the pre-test and post-test grades from each group, the Independent T-test was used to compare the pre-test grades between groups, and Mann Whitney U test was used to compare the post-test grades between both groups.

RESULTS

1. Characteristics of research subjects

The subjects of this study were 120 students who had passed the inclusion and exclusion criteria. Subjects were divided into two groups: the group that was given the intervention of the anatomical skeletal system practicum guidance book and the group that did not receive the anatomical skeletal system practicum guidance book. Subject characteristics based on sex are shown in **Table 1.** Gender characteristics in the group with the practicum guidance book and in the group without the practicum guidance book were mainly female.

Table 1. Subject Characteristics Based on Gender

Characteristics	*Experiment Group*		*Control Group*	
Gender	*N*	*%*	*N*	*%*
Male	*19*	*31,7*	*22*	*36,7*
Female	*41*	*68,3*	*38*	*63,3*
Total	*60*	*100*	*60*	*100*

2. The Overview of Pre-test and Post-test Grades of the Skeletal System Anatomy Practicum

The overview of pre-test and post-test grades of the skeletal system anatomy practicum can be seen from **Table 2.** The pre-test mean grade from the group with practicum guidelines were (40.58 ± 11.36). This result is higher than the group without practicum guidance whose pre-test mean were (27.49±13.89). Post-test median grades of the group with practicum guidance were 76.25 (63.27-97.68), which is higher than those without practicum guidance with a median of 74,32 (47,17-77,7).

Table 2. Data Distribution of Pre-test Grades and Post-test Grades

Group	Data	N	%	Mean	SD	Min	Max	Median
Experiment	Pre-test	60	50	40,58	11,36	14,76	61,49	41,01
	Post-test			75,74	7,26	63,27	97,68	76,25
Control	Pre-test	60	50	27,49	13,89	4,44	57,25	26,86
	Post-test			72,92	5,13	47,17	77,7	74,32
Total		120	100					

3. The Influence of The Skeletal System Anatomy Practicum Guide On Student Grades

The hypothetical test results can be seen in **Table 3** and **Table 4.** Based on the Wilcoxon test results, it was known that the pre-test grades of groups with the practicum guidance book and the post-test grades of the group without the practicum guidance differed significantly p = 0.000 (**Table 3).** Furthermore, according to the Independent T-test results, it was found that there was a significant difference between the pre-test grades of both groups with p = 0.000. Meanwhile, from the Mann-Whitney test results, it was known that there is a significant difference between the post-test grades of both groups with p = 0.030.

Table 3. Results of Wilcoxon Test Analysis

Group	Data	Min	Max	Median	Difference	From Hitung	Z table (a=5%)	P
Experiment	Pre-test	14,76	61,49	41,01	35,24	-6.736	1,96	0,000
	Post-test	63,27	97,68	76,25				
Control	Pre-test	4,44	57,25	26,86	47,46	-6.736	1,96	0,000
	Post-test	47,17	77,7	74,32				

Table 4. The Analysis of Independent T-test and the Mann Whitney U Test

Independent t-Test						
Data	**Group**	**N**	**Mean±SD**	**95% CI**		
				Lower limit	**Upper limit**	**p-Grades**
Pre-test	Experiment	60	40,58±11,36	8,49	17,67	0,000
	Control	60	27,49±13,89	8,49	17,67	
Mann Whitney U Test						
Data	**Group**	**N**	**Min**	**Max**	**Median**	**p-Grades**
Post-test	Experiment	60	63,27	97,68	76,25	0,030
	Control	60	47,17	77,7	74,32	

DISCUSSION

Practicum guidance books make it easy for students to improve their understanding of learning material.[5,7] This is supported by the summary of learning material provided in the book, accompanied

by the learning objective to guide students during practicum. The anatomical skeletal system practicum guidance book is also equipped with practice questions that help students recall anatomy material that has been studied to repeat learning.[9]

According to Bellier et al., using a practicum guide during the anatomy of limb dissection practicum can increase medical students' grades.[5] This is in accordance with the results of this study, namely students who were given the anatomical skeletal system practicum guidance book got a significant increase in the mean grades of the pre-test results, which was 41,01 (14,76-61,49) that in the failing category into the very good category on the post-test mean grades which was 76,25 (63,27-97,68). Another study by Nugroho et al. also found that using the cardiovascular anatomy practicum module for medical students during anatomy lessons made a significant difference in pre-test and post-test grades of the medical students of Universitas Mulawarman.[10]

This study also found a significant difference in the group's pre-test and post-test grades without the practicum guidance book. The pre-test median grades of this group were 26,86 (4,44-57,25) in the failing category, increasing to the very good category at the post-test median grade of 74,32 (47,17-77,7). This shows that learning anatomy without the practicum guidance book can affect student grades. The same result was also found by Vitorino et al., namely that there was an increase in pre-test and post-test of students when they get anatomy lessons without being given a practicum guidance book.[11]

This study also found that there were significant differences in the mean pre-test grades between groups with practicum guidance and without practicum guidance. The mean pre-test grade of the group with practicum guidance were higher than those without the practicum guidance. This may occur due to differences in students' knowledge levels before the pre-test.

This study found that medical students who were given the practicum guidance book post-test were significantly different and higher than those who did not receive the practicum guidance book. The post-test mean grades of the group with the practicum guidance were 76,25 (63,27-97,68), and the post-test mean grades of the group without practicum guidance were 74,32 (47,17-77,7). It's found to be significantly different. Students with practicum guidance's minimum grades were in the good category (63.27), while those without practicum guidance's minimum grades were in the failing category (47.17). The maximum grades for the group with practicum guidance were in the very good category (97.68), while those without practicum guidance were in the good category (77.7). This shows the influence of the skeletal system anatomy practicum guidance in increasing the anatomy grades of first semester FKIK UNJA students.

The results above align with Stunden et al., where using several teaching materials (anatomy practicum guidance via e-learning, which contains a summary of the learning material and augmented reality application) increases the students' pre-test and post-test grades. It also positively influences the learning experience and attitudes of students learning during the COVID-19 pandemic when it was difficult to access the cadavers.[12,13,14] Meanwhile, Vitorino et al. found that students who did not receive the musculus system practicum guidance book had a higher increase in evaluation results compared to students who received practicum guidance on musculus system anatomy practicum.[12]

There are several aspects that can influence the results of student grades. These aspects include internal aspects and external aspects.[15,16,17] The internal aspect consists of the student's IQ level, physical condition, students' focus, interest and talent in learning, and inner motivation.[16,15] Student learning styles are also factors that influence students' achievement.[18,19] External aspects include the learning environment, social environment, and infrastructure. Internet networks and devices are also included in the infrastructure aspect. Disruption of internet connection is the biggest obstacle for medical students during their online learning due to the COVID-19 pandemic.[20]

CONCLUSION

This study finds a significant difference between the students' pre-test and post-test grades when given the anatomical skeletal system practicum guidance book. A significant difference in pre-test and post-test grades was also found when no practicum guidance was given. In addition, significant differences were found between post-test grades of students who used the anatomical skeletal system guidance book. Based on these results, it can be concluded that the anatomical skeletal system practicum guidance book influences in increasing medical students' grades.

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