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Original Article

Effectiveness Of Using The Skeletal System Pocketbook On The Grade Of Anatomy Practicum For Medical Students At Universitas Jambi

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ABSTRACT

Background: Bone markings must be studied and mastered in learning skeletal system anatomy. The short and interesting material in the pocketbook helps students identify preparations during the practicum, increasing their understanding and gaining practical grades. This research aims to determine the effectiveness of using the Skeletal System pocketbook on grades practical anatomy block of the Integumentary System and Locomotion for medical students in the first semester of the Universitas Jambi in 2023.

Method: This research used a quasi-experimental method with a pre-test and post-test control group. The 106 sample students were from the Medical Study Program at Universitas Jambi class of 2023.

Result: The mean pre-test and post-test grades for students with pocketbooks were 61.86 and 78.04, while those without pocketbooks were 63.74 and 71.35. In the mean pre-test grade, there was no significant difference between the experimental and control groups' mean grades (p-value = 0.488). Meanwhile, in the mean post-test grades, there was a significant difference between the two groups (p-Value = 0.005), where the experimental group had a higher mean grade.

Conclusion: *There is a significant difference in using the skeletal system anatomy pocketbook on the grade of anatomy practicum for medical students at Universitas Jambi*.

INTRODUCTION

Anatomy is a field of basic medical science that studies the structure of the human body, including its shape, size, position, and spatial relationships. Anatomy knowledge is beneficial for a doctor in carrying out examinations, making a diagnosis, and providing treatment to patients.[1,2,3] Anatomy learning at Universitas Jambi has a variety of learning media, including face-to-face lectures, anatomical atlases, video guides, mannequins, dry and wet preparations (cadaver), as well as an anatomy practical guidebook according to the organ system being studied. Assessment of anatomy learning outcomes will be determined through assignment evaluation, practicum pre-post-test, and Objective Structured Practical Examination (OSPE).[4,5]

Studying anatomy is a matter of memorizing names and mastering the location of the human body's anatomical structures.[3] This requires students to read various anatomy books that are large and thick. Therefore, students often find it difficult to carry books, which can reduce interest and motivation to learn.[6,7] This problem is related to the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World's Most Literate Nations Ranked (WMLN) data regarding the very low reading interest of Indonesian people.[8,9,10] The primary cause of students' diminished interest in reading in Indonesia is attributed to their aversion to thick, unappealing, and cumbersome books.[6,7] To address this, there is a need to transform books into compelling entities that will captivate students, fostering an increased inclination towards reading.[6,11] One strategy to achieve this goal is the creation of pocketbooks.[6]

A pocketbook is a book that is small, lightweight, convenient to read, and easy to carry anywhere.[6,12] Pocket books contain information that can be described briefly and concisely. In terms of appearance, the pocketbook also has a charming design, including a combination of writing and images that can attract students' attention.[13] For students of medicine and other health fields, of course, this is very useful, one of which is in the process of learning the anatomy of the human body.[14] Many aspects must be studied and mastered in anatomy learning material, especially the skeletal system which has a lot of bone markings so it often makes it difficult for students to remember them.[14,15] Moreover, this first semester is a transition period from student to student. Of course, there are several differences in both the curriculum and the flow of educational programs, so adjustments are needed in terms of time, learning media and learning methods. This situation can affect the practical grade of first-year students. The use of pocketbooks supports students to learn effectively and efficiently both in understanding the material, place and short practicum time. The source material in this pocketbook is taken from several relevant atlases and anatomy textbooks. Meanwhile, the source of the images in this pocketbook is taken directly from skeletal preparations at the Anatomy Laboratory at Universitas Jambi so that it can be a guide for students in identifying the same preparations during the practicum.[6,14] This research aims to determine the effectiveness of using the Skeletal System pocketbook on grades practical anatomy block of the Integumentary System and Locomotion for medical students in the first semester of the Faculty of Medicine and Health Sciences, Universitas Jambi in 2023.

METHOD

This quantitative research uses a quasi-experimental design with the pre-post-test control group.[16] The population in this study were all medical students in the class of 2023 who took part in the Integumentary and Locomotion Systems block at Universitas Jambi. Sampling was done using a total sampling technique; the sample number was the same as the existing student population. This research used the instrument of a skeletal system anatomy pocketbook in softcopy form and pre-test and post-test questions for practicum anatomy of the

skeletal system on the e-Learning Universitas Jambi platform. These two instruments have been validated by the anatomy lecturer concerned. The research was conducted at the Universitas Jambi Medical Study Program in October 2023.

The inclusion criteria for this study were medical students class of 2023 who contracted the Integumentary System and Locomotion block and took the pre-test and post-test in the anatomy practicum, while the exclusion criteria for this study were medical students class of 2023 who were not willing to be the research sample. The sample was divided into two groups, namely the experimental group and the control group.[17] The experimental group was a group of students who were given additional learning media in the form of a Skeletal System pocketbook, while the control group was a group of students without a Skeletal System pocketbook. During the research, 9 samples dropped out because they did not meet the predetermined inclusion and exclusion criteria. Therefore, of the 115 students, only 106 students could be used as samples in this study, namely 53 samples in the experimental group and 53 samples in the control group.

Before the practicum took place, both groups of students were given a pre-test first. Each group was given 120 minutes of practicum time. The first group will do a practicum using preparations, anatomy textbooks, anatomy atlas and additional media in the form of a Skeletal System pocketbook, while the second group will do a practicum using preparations, anatomy textbooks and anatomy atlas only. Next, both groups were given a post-test to determine students' understanding during the practicum. The pre-test and post-test grade will be analyzed for differences between the two groups.

The data that has been managed is then analyzed using the Statistical Product Service and Solution (SPSS) program on the computer. In this research, the type of analysis applied includes univariate and bivariate analysis. Univariate analysis is used to define and provide an overview of the presentation and distribution of the independent and dependent variables. Before analyzing bivariate, a data normality test was carried out using the Kolmogorov- Smirnov test, resulting in every grade for both groups being normally distributed. Test the difference between pre-test and post-test grades using the Dependent T-test (Paired T-test). In addition, a difference test was carried out between the experimental and control groups using the Independent T-test.

RESULT

This research uses data in the form of pre-test and post-test grades for the anatomy practicum block of the Integumentary System and Locomotion based on the number of questions answered correctly on the e-Learning Universitas Jambi platform.

Characteristics of Research Subjects

The subjects of this study were medical students in the Class of 2023 at Universitas Jambi who met the inclusion and exclusion criteria, namely 106 samples. The sample of students was divided into two groups, namely the experimental group with a skeletal system anatomy pocketbook totaling 53 subjects and the control group without a skeletal system anatomy pocketbook totaling 53 subjects. The results of this research are presented in the form of univariate analysis, namely regarding the description of sample characteristics based on gender and the frequency distribution of pre-test and post-test grades. The following is a description of the research subjects in the experimental group and control group based on gender characteristics.

Table 1. Subject Characteristics Based on Gender

Groups	*Characteristics Gender*		*Total*
	Male	**Female**	
Experiment (with a pocketbook)	17	36	53
Control (without pocketbook)	16	37	53
Total Research Subjects			106

Subject characteristics based on gender are shown in **Table 1**. The female gender dominates both the experimental and control groups. The number of female subjects was 36 subjects in the experimental group and 37 subjects in the control group.

Procesing the practicum data results, we obtained a frequency distribution of pre-test and post-test grades from each group including the minimum grade, maximum grade, mean and middle grade which are shown as follows.

Table 2. Frequency Distribution of Pre-test and Post-test Anatomy Practicum grades

Group	N	Mean	SD	Median	Min	Max
Experiment (with a pocketbook)						
Pre-test	53	61,86	14,979	63,63	15,15	81,81
Post-test	53	78,04	12,001	78,78	57,57	96,96
Control (without pocketbook)						
Pre-test	53	63,74	12,868	63,63	27,27	81,81
Post-test	53	71,35	11,804	72,72	33,33	87,87
Total	53					

Frequency distribution of pre-test and post-test anatomy practicum grades can be seen from **Table 2**. The experimental group with the skeletal system pocketbook had a mean pre- test grade of (61.86 ± 14.979), and post-test of (78.04 ± 12.001); and a mean pre-test grade of 63.63 (15.15-81.81) and post-test 78.78 (57.57-96.96). Meanwhile, the control group without a skeletal system pocketbook had a mean pre-test grade of (63.74 ± 12.868) a post- test of (71.35 ± 11.803); and a mean pre-test grade of 63.63 (27.27-81.81) and post-test 72.72 (33.33-87.87). Paired Sample T-test is a parametric test that compares two paired data. The Paired Sample T-test is aimed at finding out whether there are differences in the mean grades of the pre-test and post-test, both in the experimental group and the control group..

Table 3. Mean Practicum Grade Between The Two Groups

Groups	*Mean ± SD*	*Confidence Interval 95%*		*p-value*
		Lower Limit	**Upper Limit**	
Pre-test				
Pre-test	61,86 ± 14,979	57,73	65,99	0.000
Post-test	78,04 ± 12,001	74,73	81,34	
Control (without pocketbook)				
Pre-test	63,74 ± 12,868	60,20	67,29	0.000
Post-test	71,35 ± 11,804	68,09	74,60	

Table 4. Results of Independent T-Test Analysis

Groups	*Mean ± SD*	*Confidence Interval 95%*		*p-value*
		Lower Limit	**Upper Limit**	
Pre-test				
Experiment (with a pocketbook)	61.86 ± 14,979	57.73	65.99	0.488
Control (without pocketbook)	63.74 ± 12,868	60.20	67.29	
Post-test				
Experiment (with a pocketbook)	78.037 ± 12,001	74.73	81.34	0.005
Control (without pocketbook)	*71.248 ± 11,804*	*68.09*	*74.60*	

Based on **Table 4**, it is known that the results of the Independent T-test showed that in the pre-test mean difference was p-Value = 0.488, while in the post-test mean difference test p-Value = 0.005. So it can be concluded that there is no difference in the mean pre-test grades between the experimental group and the control group, while in the post-test grades, there is a mean difference between the experimental group and the control group. In other words, the initial knowledge of both groups before being given the intervention was the same and after the intervention with the application of additional learning media in the form of a pocketbook, it could help improve students' understanding better than without a skeletal system pocketbook. Where learning with a skeletal system pocketbook will produce a higher average grade for anatomy practicum compared to conventional learning without a skeletal system pocketbook.

DISCUSSION

Based on research conducted on 106 medical students from the Class of 2023 at Universitas Jambi, both the experimental group and the control group in the skeletal system practicum had the characteristics of being dominated by female students. There were 36 subjects in the experimental group and 37 subjects in the control group.

The intervention behavior was given a skeletal system pocketbook with a period from the initial to the final assessment of 120 minutes. It was found that there was a mean difference between the pre-test and post-test grades, which was higher than in the group without the skeletal system pocketbook. The experimental group had a mean pre-test grade of (61.86 ± 14.979) and a post-test of (78.04 ± 12.001) which was significant (p-Value = 0.000), so it could be concluded that hypothesis was accepted. This shows that there is a significant difference in the use of the skeletal system pocketbook towards increasing the grade of anatomy practicum. In contrast, with the skeletal system pocketbook, the average post-test grade of students reaches the very good category. The reason is that the skeletal system pocketbook contains brief, concise and clear information, charts, tables and images whose structures have been identified based on preparations in the Anatomy Laboratory at Universitas Jambi.

The pocketbook aids students in recognizing necessary preparations during practical training, guiding their self-directed learning and contributing to improved comprehension, as evidenced by higher grades in practical exercises. As reported by Chairudin and Dewi (2021) in their research, the ability of students with pocketbooks to understand the material has increased, which can be seen from the increase in learning outcomes in the form of an average pre-test grade in the bad category to a post-test grade in the good category.[18] According to Hidayat and Sopiyandi's (2019) research, classes taught using pocketbook media were more effective, and the increase in knowledge grades after the pocketbook media intervention was greater than before using pocketbooks. This can be seen from the increase in student learning outcomes of 36.9 from the average pre-test grade obtained. This

study also found that the use of digital book-based pocketbooks was more effective than printed teaching materials to improve student learning outcomes.[19] This is in line with research by Hanif et al. (2019), that students' knowledge was better after the intervention using the PHBS pocketbook at school compared to without using the pocketbook, this statement was proven by the difference in attitudes that were better after the intervention.[20]

Arranging the contents of the pocketbook concisely, containing colorful designs and pictures by the preparation being taught, can attract students' attention. The use of pocketbooks is considered effective because, simultaneously with the implementation of practicums in identifying wet and dry preparations; it helps students understand bone markings, joints, and the resulting movements, thereby increasing students' practicum grades. The study by Wulansari et al. (2021) also obtained the same results as this study, namely an increase in post-test grades in the group with pocketbooks, indicating that the subjects experienced a better increase in knowledge after carrying out Health Education using pocketbook media. He also outlined the advantages of employing pocketbooks, emphasizing their effectiveness in facilitating a more straightforward and more enjoyable learning process. The designs are printed in full color, enhancing their visual appeal. Additionally, pocketbooks prove to be efficient in terms of time and energy utilization, and their compact size makes them convenient for students to carry. Writing material concisely and clearly can improve the quality of the student learning process; attractive and full-color designs of pocketbooks can foster students' positive attitudes towards the material and the teaching and learning process.[21] Similarly, research conducted by Suryanda et al. (2019), a biology pocketbook with a colorful mind map design, obtained an average grade that is very suitable for use by students and is considered by teachers as an effort to speed up the learning process.[22]

Apart from that, the increase in grades for using the skeletal system pocketbook is also because there are worksheets at the end of each chapter which can be used as practice by students. The worksheet itself will make students repeat the material they have read, thereby increasing understanding and increasing students' grades. This is in line with the research results of Sulistyani et al. (2018), namely that learning with a pocketbook containing worksheets at the end of each chapter can encourage students to learn independently and make it easier for students to understand the material.[23]

The difference in anatomy practicum grades in the experimental group and the control group can be seen from the comparison of students' pre-test and post-test grades. In pre-test testing, both groups had a mean pre-test grade (p-Value = 0.488) where the pre-test grade for the experimental group was (61.86 ± 14.979) and the control group grade was (63.74 ± 12.868), so it can be concluded There was no significant difference between the pre-test grades of the two groups, indicating the possibility of similarities in the initial level of knowledge between the two groups before the research was carried out. This can happen because the learning media or references for both groups to prepare for practicum come from the same source, for example from anatomy atlas books and lecture materials previously provided by the lecturer. Meanwhile, in the post-test, the two groups had a statistically significant difference (p-Value = 0.005) with the experimental group's post-test grade (78.04 ± 12.001) being higher than the control group (71.35 ± 11.804). This is in line with research by Sulistyani et al. (2018) practicum results show that students who use pocketbooks have better post-test grades than students without using pocketbooks.[23] These results are similar to other research by Tuminah et al. (2018), namely that there is a significant difference between students who use pocketbooks and those who do not use pocketbooks in their learning process. Students who use pocketbooks get better results compared to

students without using pocketbooks.[23] The same thing was also found in research by Hidayah and Sopiyandi (2018) that the difference in knowledge grades before and after the intervention of giving pocketbooks was greater than without giving pocketbooks.[19] Not only that, research by Hanif et al. (2018) obtained a difference in the mean grade of the experimental group that was twice as large as the control group, so it can be concluded that the treatment of the experimental group after the intervention was more effective than the control group.[20]

In this research, several factors can influence the research results, namely internal and external factors. The internal factors of the subject have a big influence on the experiments carried out, including the knowledge of independent learning that the sample had before the practicum, accuracy in taking the pre-post-test, the length of time reading the pocketbook, the ability to absorb skeletal system pocketbook material during the practicum, Intellectual Quotient (IQ), the level of student concentration in understanding, student interest and motivation to learn, as well as the student's physiological condition. External factors relate to student facilities, such as not having supporting devices so they have difficulty accessing the e-Learning Universitas Jambi platform, as well as inadequate network quality depending on the campus environment. This is what can cause some research sample pre-test answers not to be input so that the sample must be included in the exclusion criteria. Several gaps in this research can be used for further research, both in terms of instruments, subjects, and other factors that can be studied further. Such factors from the subject can be done by taking specific samples. For example, samples are grouped based on IQ, and pre-test grades, or can provide a special time and place outside of the actual practical implementation so that confounding factors are minimal.

CONCLUSION

This study finds a significant difference between the mean practicum grades of groups of students who used and did not use skeletal system pocketbook in the anatomy practicum block of the integumentary system and locomotion in the Universitas Jambi Medical Study Program in 2023, where the mean practicum grades were higher for students who used skeletal system pocketbook. Based on these results, it can be concluded that the skeletal system pocketbook is effective in increasing medical students' grades.

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