

# The Differences of Learning Achievement of Vein Puncture Using Mannequin Learning Objects and Real Patients

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## ABSTRACT

**Background:** Clinical competence is a mandatory requirement in medical education. The learning form of clinical competence is the skills lab. This learning activity uses tools that resemble the actual conditions of the patient. This study aims to compare the effectivity of learning venous puncture using mannequin and real patients based on students' perception.

**Method:** This research is an observational-cross sectional study, with one-time data collection process, by filling out a questionnaire. The research subjects were young doctors who had undergone the clinical laboratory stage. The research location is the hospital partner of Faculty of Medicine, Universitas Islam Indonesia (Regional Public Hospital of Kebumen and PDHI Hospital). Respondents filled out a questionnaire that can be accessed online. Data is then analysed for the differences with the T-Test.

**Result:** The T-Test analysis shows that p-value = 0.006 on clinical knowledge using mannequin learning objects and real patients. These results indicate that students's perceptions of clinical knowledge of venous puncture using real patients are better than using mannequins. Meanwhile, there was no significant difference in the clinical skills of venous puncture using mannequins and real patients, p value = 0.684.

**Conclusion:** Based on students' perception, there are differences in the achievement of clinical knowledge in learning venous puncture using mannequin learning objects and real patients.

**Keywords:** Skills lab, venous puncture.

## 1. INTRODUCTION

Clinical competence is an important indicator that must be achieved in medical education. Skills lab is a clinical learning activity using tools similar to the actual condition of the patient, called mannequin. One of the patient sampling methods in the skills lab is venous puncture. Venous puncture is important to be studied because it will show abnormal findings that will support the diagnosis process.

The difference between undergraduate program and the clerkships in the learning object. While undergraduate program students use tools or mannequins, clinical students learn from the patient directly. What is learned in the undergraduate program period is provision in carrying out the role of a clinical student, including the process of taking blood samples with venous puncture.

This study aims to show the perceptions of clinical students of Faculty of Medicine, Islamic University of Indonesia in examining the effectiveness of learning venous puncture. Learning that is carried out in the skills lab will be evaluated whether it provides sufficient provision for clinical students when dealing with patients.

This is important because the learning process in the undergraduate program and the clerkships are equally important. Learning process must provide a good understanding to mitigate potential errors in handling patients. The results of this research become recommendations or suggestions for the learning system that has been taking place.

This study aims to compare the effectivity of learning venous puncture using mannequin and real patients based on students' perception.

## 2. LITERATURE REVIEW

Competence shows certain knowledge, skills, and attitudes of a profession in certain skill characteristics, which are the characteristics of a professional [1]. Clinical competence is an important indicator that must be achieved in medical education. One of the clinical competencies in medical education is venous puncture which has a 4A level of competence, which means that the students are able to perform independently [2]. Clinical competence about venous puncture can be achieved with appropriate learning methods.

Learning is an effort to teach students. In learning, students not only interact with the teacher or those who teach them, but also interact with the entire learning resource [3]. Learning outcomes are abilities obtained through the internalization of knowledge, attitudes, skills, competencies, and the accumulation of work experience [4].

Medical education in Indonesia consists of two phase, undergraduate program and the clerkships from the object of learning. For undergraduate program students, we will use the lab skills learning method. The skills lab is a means for students to practice their clinical skills. It plays an important role in training the clinical skills of medical students to achieve competency standards at the undergraduate program [5].

Skills lab activities are carried out by students' practices and will be given feedback after practicing these medical procedures [6]. This skills lab method is carried out using mannequins or tools that are designed to have similarities with real patients. The aim of this activity is to allow students to practice directly but still prioritize patient safety, as there is a risk failure due to procedural errors in undergraduate program [7].

In this undergraduate program, students will learn by carrying out the role of clinical students, including the process of blood sampling and venous puncture. Most students consider learning process with a mannequin as a tool can allow them to gain skills for medical procedures [8].

Meanwhile, in the the clerkships, students learn from patients directly under the supervision of their supervisor. In this phase, students can try directly without using a mannequin.

## 3. METHODS

Design of this study was an observational cross-sectional study, with one-time data collection. This study was conducted at the hospital partner of Faculty of Medicine, Universitas Islam Indonesia (Regional Public Hospital of Kebumen and PDHI Hospital), which consisted of a young doctor who was undergoing a

children's department stage and an internal medicine department stage. Respondent data was obtained from the Clinical Department, Faculty of Medicine, Universitas Islam Indonesia.

The study was carried out in December 2020. Data was collected using a questionnaire, distributed to students of the clerkships (young doctors), Faculty of Medicine, Universitas Islam Indonesia, who had undergone the laboratory department stage. The questionnaire is self-assessment, in which respondents are asked to self-assess and perceptions their experience of learning venous puncture both when using mannequins and using real patients, in accordance with the statement of the instrument. The questionnaire consisting of 12 statements stating the students' feelings (perceptions) and experiences regarding the learning of venous puncture with mannequins and real patients. For the first 10 statements, each statement is assessed with a score of 1 – 4 with total score 40 for first 10 statements. Meanwhile, for the last 2 statements assessed with a score of 1-10 with total score 20. The questionnaire instrument has also passed the questionnaire validation stage with the expert. The data was analysed descriptively to identify the percentages of each item statement. The mean of these two group data was then compared using T-test.

## 4. RESULTS

This study was conducted in December 2020. The number of respondents involved was 65 students who were taking the the clerkships (young doctors) at the hospital partner of Faculty of Medicine in Universitas Islam Indonesia (Regional Public Hospital of Kebumen and PDHI Hospital), who were undergoing children's and internal medicine department stages and had undergone laboratory department stage.

Total of 65 students filled out a questionnaire consisting of 12 statements stating the students' feelings and experiences regarding the learning of venous puncture with mannequins and real patients. The data collected from the experiences of 65 students (Table 1) showed that there was no significant difference of the knowledge of venous puncture during the undergraduate program study program and the the clerkships ( $p = 0.309$ ). However, there was a significant difference in the clinical skills of venous puncture in undergraduate program study program (mannequins) and venous puncture in the clerkships (real patient) ( $p = 0.006$ ). Likewise, the enjoyable experience of learning venous puncture with mannequins was compared with studying venous puncture with real patients ( $p = 0.000$ ). Then there was a significant difference of the frequent failure of venous puncture with mannequins compared with patients ( $p = 0.004$ ). There was also a significant difference of the empathy of venous puncture failure with mannequins compared to venous puncture in real patients

( $p = 0.000$ ). Meanwhile, for venous puncture skills with mannequins during undergraduate program compared to patients during professional education, according to students' own assessments, there was no significant difference ( $p = 0.684$ ).

**5. DISCUSSION**

This study aims to figure out the perceptions of clinical students of the Faculty of Medicine, Universitas Islam Indonesia in examining the effectiveness of venous puncture learning, especially between undergraduate program programs using mannequins and the clerkships using real patients.

Table 1. The Statistical Analysis of The Differences of Learning Achievement of Vein Puncture Between Using Mannequins Learning Objects and Real Patients

Item Statements	Under graduate	Clerkships	P value
Knowledge of venous puncture	3.2	3.3	0.309
Clinical skills of venous puncture	2.8	3.2	0.006
Venous puncture learning with mannequins	2.7		0.000
Learning venous puncture with patients is fun		3,5	
Failure of Venous puncture with mannequins is common	2.4		0.004
Failure of venous puncture with actual patients is common		2.8	
Empathy for failure of venous puncture with mannequins	2.0		0.000
Empathy for failure of venous puncture with real patients		3.5	
My venous puncture skills with mannequins during undergraduate program study program according to my own assessment	5.6		0.684
My venous puncture skills with patients during professional education according to my own assessment		5.8	

Clinical competence is an important indicator that must be achieved in medical education. One of the clinical competences in medical education is venous puncture which has a 4A level of competence, which means that it is able to perform independently [2]. In this case, venous puncture is very important and students are expected to do it properly and correctly.

Medical education consists of two phases, the undergraduate program and the clerkships. The undergraduate program phase consists of theoretical and practical learning with simulations. Meanwhile, the the clerkships consists of the implementation of the undergraduate program phase with direct practice to the patient [5]. Medical skills education can use medical simulations which are imitation activities of various clinical situations using well-designed medical scenarios, which present actual patients as standard patients, animal, or synthetic model (mannequin) to suit the case [9].

The first aspect in the item statements of the questionnaire of this study, the knowledge of venous puncture, shows that there is no significant difference of the knowledge of puncture during the undergraduate program and the the clerkships. This is in line with existing research which shows that a significant difference lies on clinical knowledge. Meanwhile, general knowledge tends not to different significantly.<sup>10</sup>

Students' clinical skills of venous puncture at the time of undergraduate program and the clerkships had a significant difference ( $p = 0.006$ ). Students can recognize and understand clinical knowledge of venous puncture in their learning experience in the the clerkships. Students can participate in active learning with high expectations of a value on their performance.<sup>1</sup>

Other aspects such as student's experience related to an enjoyable venous puncture learning, frequent venous puncture failure, and empathy for venous puncture failure

in this study showed significant differences. In the research conducted by Karla (2017), also states that this study reflects the main advantage of clinical practice, that students have direct and more frequent learning experiences, which require students to work with other students and other professionals. These clinical simulations provide more hands-on experience compared to undergraduate program [11].

In the last aspect, according to students' own assessments, there is no significant difference of venous puncture skills during undergraduate program education and professional education ( $p = 0.684$ ). This shows that according to students, venous puncture skills are not considered to be significantly different using mannequins and real patients. The last aspect is the perception of students in assessing themselves. It is not meaningful because students already have a good level of satisfaction while during undergraduate program and the clerkships.

This study has limitations because the questionnaire used in this study only covers six aspects of student's experience of venous puncture learning in both

undergraduate program and the clerkships. Our recommendation for further research is to add another aspect to describe students experiences related to learning venous puncture so that more findings can be obtained.

## 6. CONCLUSION

Students' clinical skills of venous puncture at the time of undergraduate program and the clerkships had a significant difference. The enjoyable experience of learning venous puncture with mannequins was compared with studying venous puncture with real patients also had a significant difference. Then there was a significant difference of the frequent failure of venous puncture and the empathy of venous puncture failure with mannequins compared with patients. Based on students' perception, there are differences in the achievement of clinical knowledge in learning venous puncture using mannequin learning objects and real patients.

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