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Comparative study of the effectiveness of the conventional training program and a manikin-based training program for Chulalongkorn University medical students in venipuncture training

Viroj Wiwanitkit*

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Objective : *To compare the effectiveness of the conventional and a manikin-based training program for Thai medical students in venipuncture training.*

Design : *After - only experimental study*

Setting : *Faculty of Medicine, Chulalongkorn University*

Subjects/methods : *An experimental study was performed with 30 medical students (13 male and 17 female) in academic year 1998 of the Faculty of Medicine of Chulalongkorn University. All subjects were randomly assigned in to two equal groups: Group A with the conventional program and Group B with a manikin-based training program. An evaluation of training effectiveness in each group was performed. It revealed that there was no significant difference between the proportions of subjects passing evaluation between both groups ($P > 0.05$).*

* Department of Laboratory, Faculty of Medicine, Chulalongkorn University

Results : *When comparing the post-test effectiveness score between the two groups (Table 2), there was also no statistically significant difference ($P > 0.05$). No complication from the training method was found in either program.*

Conclusion : *Although the conventional training program provides equal effectiveness as the manikin-based program, the author still recommends the manikin-based training program as addition for medical ethics reasons.*

Key words : *Effectiveness, Training program, Venipuncture.*

Reprint request : Wiwanitkit V. Department of Laboratory, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

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วิโรจน์ ไววานิชกิจ. การศึกษาเปรียบเทียบประสิทธิภาพการฝึกหัดเจาะเลือดด้วยวิธีประเพณีนิยมและวิธีแบบใช้หุ่นจำลองเป็นสื่อในการสอนในนิสิตแพทย์จุฬาลงกรณ์มหาวิทยาลัย. จุฬาลงกรณ์เวชสาร 2545 ก.พ; 46(2): 137 - 42

วัตถุประสงค์ : *เพื่อเปรียบเทียบประสิทธิภาพการฝึกหัดการเจาะเลือดสำหรับนิสิตแพทย์ไทยด้วยวิธีแบบประเพณีนิยมและวิธีแบบใช้หุ่นจำลองเป็นสื่อในการสอน*

รูปแบบการศึกษา : *การศึกษาเชิงทดลองแบบวัดผลภายหลัง*

สถานที่ทำการศึกษา : *คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย*

ตัวอย่างที่ทำการศึกษา/วิธีการศึกษา : *ได้ทำการศึกษาเชิงการทดลองโดยได้ทำการศึกษาในกลุ่มตัวอย่างนิสิตแพทย์ 30 คน (ชาย 13 หญิง 17) ในปีการศึกษา 2451 คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย โดยแบ่งนิสิตทั้งหมดเป็น 2 กลุ่มเท่า ๆ กันโดยการสุ่ม คือ กลุ่ม A ได้รับการฝึกหัดแบบประเพณีนิยม และกลุ่ม B ได้รับการฝึกหัดแบบใช้หุ่นจำลองเป็นสื่อในการสอน ภายหลังจากการฝึกหัดเสร็จสิ้นได้ทำการประเมินประสิทธิภาพของวิธีการฝึกหัดในแต่ละกลุ่ม*

ผลการศึกษา : *ไม่พบความแตกต่างอย่างมีนัยสำคัญทางสถิติในสัดส่วนของนิสิตที่ผ่านการประเมินระหว่างทั้งสองกลุ่ม นอกจากนั้นยังพบว่าแต้มประเมินประสิทธิภาพโดยเฉลี่ยในกลุ่มที่ทำการศึกษาทั้งสองกลุ่มไม่แตกต่างกัน*

สรุป : *แม้ว่าการฝึกหัดด้วยวิธีแบบประเพณีนิยมจะให้ผลสัมฤทธิ์ที่ดีใกล้เคียงกับการใช้หุ่นจำลองเป็นสื่อการสอน แต่ผู้นิพนธ์มีข้อเสนอแนะให้ใช้วิธีการใช้หุ่นจำลองเป็นสื่อเสริมในการสอนด้วยเหตุผลทางจริยธรรมทางการแพทย์*

คำสำคัญ : *ประสิทธิภาพ, การฝึกหัด, การเจาะเลือด*

Venous blood specimens are necessary for many laboratory tests. Therefore, venipuncture is an important medical procedure that all newly graduated physicians should perform correctly. In Thailand, newly graduated physicians are initially required to work in community hospitals and to perform various medical procedures by themselves. Thus adequate training of the basic skills before graduating is necessary. Good practice cannot be expected without proper training. Training for medical procedures is thus an important topic of medical education.[1] To conform to patient's right and safety, evaluation of medical procedure training is necessary. Conventional clinical skill training programs are comprised of classroom lectures and clinical practice. This may create risks to the patients due to unskilled techniques. To cope with this, many modern training programs have been introduced, including rubber manikin-based training programs.

In this study, a comparison of the effectiveness of the conventional program and a manikin-based program for venipuncture training was conducted. Results from this study can be used in the planning of training programs for medical students.

Materials and Methods

This study was designed as an after-only experimental study. The subjects were 30 of the medical students who took the venipuncture training course in academic year 1998. All subjects were randomly assigned to two equal groups, Group A and Group B. Initially, all than received lectures and demonstrations of the venipuncture procedure. Group A was than assigned into the conventional training program which received no supplementary intervention. Group Bwas assigned into the manikin-training program, which received rubber arm training practice as a supplementary media. Following the training, all subjects were assigned to perform real venipuncture in humans. Medical staff observed the practice and evaluated the subjects by check list in which every critical step had to be done correctly according to laboratory medicine protocol. The effectiveness score of each subject was recorded and graded using criteria of the Ministry of Education. Grades were High 75 %, Fair 50 – 70 % and Low 0 – 49 %. High and Fair levels of effectiveness were accepted as passing. Complications from practice were also recorded. Comparison between both groups was evaluated using the T- test at a significance level of 0.05.

Results

In the total of 30 subjects in this study there were 17 females (56.7 %) and 13 males (43.3 %). The results of the evaluation are shown in Table 1. There was no significant difference of proportions of subjects passing evaluation between Group A and Group B ($P > 0.05$). When comparing the post – test effectiveness scores between the two groups (Table 2), there was no statistically significant difference ($P > 0.05$). No complications from the practice was found in either program.

Table 1. Subjects in this study.

Group	Pass evaluation		Not pass evaluation	
	Male	Female	Male	Female
A	3	5	3	4
B	4	4	3	4

Table 2. Mean scores of post-test effectiveness score.

Group	Effectiveness score		
	Male	Female	Total
A	48.3 ± 15.7	45.6 ± 21.1	46.7 ± 19.2
B	54.3 ± 22.6	43.8 ± 15.8	48.7 ± 20.0
Statistical significant	NS	NS	NS

Discussion

Medical procedure training is very important in medical education because without good training, good practice cannot be expected. Although manikin training has been used in Thailand for years, there have been only a few reports included in the review literature[2 - 3] about the effectiveness of this new technique compared to the conventional technique. Since medical education in Thailand is different from other countries in many factors,[4] a training method accepted aboard may not be effective in Thailand. Evaluation of the medical procedure training programs is necessary. This study can provide basic information for improving medical education.

Venipuncture is the most basic medical procedure for physicians and it can be a good model for other medical procedures. Practicing venipuncture occurs in every medical school. This study revealed that the effectiveness of conventional training program was not different from the manikin-based program. The proportions of subjects who passed the evaluation and the average effectivenesss scores in both groups were not different. Furthermore, the complication rates from both training programs were not different. This implies that both training programs have good quality. Although the conventional training program is equally as effective as the manikin-based program, the latter program should be preferred because of patient's rights. All medical procedures require permission from the patients.[5] Untrained medical personnel should not perform any procedures on the patients. Due to ethics, there must be the least danger to the patient if medical staff allow their students to practice procedures.

However the real humanistic training is still necessary due to the fact that it can provide the sense of reality which is important part in skill formation. Although the quality of the conventional training program is high and provides direct experience, the model training should be considered as an addition due to the ethics. Training in models before performing in actual humans reduces risks to the patients. And when medical staff plan to train their students the actual procedure in humans, they should first ask for permission from the patients.[5] Informed consent is important in any medical practice.[5 - 7] Practice without informed consent is considered illegal. Many models have been constructed to serve the needs of medical education such as rubber arm, pelvis complete manikins, etc. Therefore, medical staff should consider the appropriate model for training their students.

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