ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 11, pp.75589-75591, November, 2018

DOI: https://doi.org/10.24941/ijcr.33134.11.2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

LOW COST CATHETERIZATION MANNEQUIN AS LEARNING MEDIA: IMPACT IN PERFORMANCE AND MOTIVATION

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ARTICLE INFO

Article History:
Received 09th August, 2018
Received in revised form
22nd September, 2018
Accepted 12th October, 2018
Published online 30th November, 2018

Key Words:
Male catheterization, Mannequin, Low cost, Clinical skills, Motivation.

ABSTRACT

Clinical skills had been taught since the early years. Methods in clinical skills learning need media as mannequin and standardized simulated patient. Clinical performances are skills needed by medical students to become a doctor. Motivation is needed to complete a task. To determine the difference of performance and motivation of students using standardized and low cost male catheterization mannequin. This experimental study included 48 fourth year medical students, whom were divided into each 5 of experimental and control groups. Experimental group used low cost mannequin, while control group used standardized. Skills' checklist in module and intrinsic motivation inventory were used to assess performance and motivation. P value of Mann Whitney test for differences of catheterization skill performances was 0.091. The average value of catheterization skills in control group was 95.06 (SD 4.856), with a range of 82.35-100. In experimental group, the mean value was 97.32 (SD 3.423) with a range of 88.24-100. All p values for subscales of motivation and total motivation were above 0.005. The subscale of motivational value appears to be higher than other elements, while the element of perceived choice was the lowest for both groups. The average score of total motivation was 85.09 (SD 6.915), with a range of 70.45-93.18, while in experimental group, the mean score for total motivation was 87.01 (SD 5.842) with a range of 76.14-94.32. Performance and motivation values of groups using low cost mannequins were higher than those using standard mannequins, although statistical calculations were not meaningful.

Citation: Indah Puspasari Kiay Demak, Diah Mutiarasari, Andi Alfia Muthmainah Tanra and Puspita Sari, 2018. "Low cost catheterization mannequin as learning media: Impact in performance and motivation", *International Journal of Current Research*, 10, (11), 75589-75591.

INTRODUCTION

Clinical learning has been implemented since the beginning of lectures. In its implementation, learning clinical skills require the help of mannequins or simulated patients (Al-Elq, 2010). However, the price of mannequins is still considered expensive and difficult to obtain the maintenance and spare parts because they are imported. Therefore, it is necessary to develop mannequins to make use of inexpensive materials with designs that make it easy to maintain. Clinical perfomances are various skills presented by medical students that are needed to be a medical doctor. Clinical skills acquintance is a compulsory clinical competences for medical students to become a medical doctor. The differences of learning clinical skills in preclinical and clinical training are contextual and standardized. Students are required to be competent before dealing with real patients (Suryadi, 2008). Bond & Spurrit (Bond, 1999) stated that there are four phases in clinical learning, namely cognitive phase, *closed skill acquisition phase, openskill acquisition phase, and autonomous phase.* Motivation is a desire and energy needed to complete a task and achieve a target or goal. Motivation involves biological, emotional, social and cognitive elements. Motivation consists of two types, namely intrinsic motivation and extrinsic motivation (Kayalar, 2016). Intrinsic motivation is stated as the activity for its inherent satisfactions than for some separated consequences. A person is motivated intrinsically when he/she feels fun or challenge (Ryan, 2000). Intrinsic motivation is assessed using intrinsic motivation inventory (IMI), which has six subscale scores: interest; perceived choice; value; effort; felt pressure and tension and perceived competence. The subscale Interest is the direct assessment of the intrinsic motivation, because it measures the interest and inherent pleasure in specific activity. Perceived Choice and perceived competence \ are stated as positive predictors of intrinsic motivation and are related to the self-determination theory. The Value subscale expresses the idea that people internalize and develop more self-regulatory activities when experience is reflected as valuable and useful for them. While Effort is a distinctive variable that is relevant to some motivation

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questions (Self-Determination Theory, 2018 and Monteiro, 2015). The objective of this study is to find out the differences in performance and motivation of catheterization skills of students who use mannequins with low cost materials and standardized mannequins.

METHODS

The study is an experimental study with 48 fourth-year medical students. Subjects were divided into 5 control groups and 5 experimental groups. The control group conducted a catheter installation practicum using standardized mannequins and experimental groups using low cost mannequins. Performances were assessed using checklist in skills lab module, whereas, motivation was assessed by questionnaire of intrinsic motivation inventory. This instrument has three subscales that assess participant's interest/enjoyment, perceived competence, and value/usefulness.

RESULTS

Data collection was carried out from June to July 2018. The research stage was carried out by collecting secondary data to see the number of students who were the subject of the research and their characteristics. The research subjects were the fourth-year medical students of Tadulako University in Palu, which was 53 students. Students then divided into 2 groups, namely the control group and the experimental group. There were 5 control groups and 5 experimental groups by considering GPA (Grade Point Average) and OSCE (Objective Structure Clinical Examination) scores. There were 5 students who dropped out form the study because they were not present at one of the practical sessions. therefore, there were 48 student remaining until the end of the study.

As seen in Table 1, the subjects were 33 female and 15 male preclinical students, with a range of 19-22 years of age. The score of performance was taken from 11 items of catheterization skills that was assessed by instructor. The value in the checklist consists of a score of 0, 1 and 2. score 0 means that the student does not do the skills according to the question item. Score 1 means that the students do it imperfectly. Score 2 means that the student is doing perfectly. Finally, the lowest score is 0 and the highest score is 22. The score then converted in to a hundred percent. Table 2 below shows the score of catheterization skills. Table 2 showed the Catheterization skill performances of both groups, the average score of control groups was 95.06 (SD 4.856), with a range of 82.35-100. In the experimental group, the mean score was 97.32 (SD 3.423) with a range of 88.24-100. Motivational value is obtained from the motivation questionnaire which consists of 3 parts including interest / enjoyment, value / usefulness and perceived choice with 22 statements. There are 7 statements for interest / enjoyment, 9 statements for value / usefulness and 6 statements for perceived choice. The answers consist of strongly agree (score 4), agree (score 3), disagree (2) and strongly disagree (1). The lowest score for motivation is 0 and the highest is 100. In Table 3, the subscale of value appears to be higher than other elements. On the other hand, the element of perceived choice is the lowest for both groups. The average score of total motivation was 85.09 (SD 6.915), with a range of 70.45-93.18, while in experimental group, the mean score for total motivation was 87.01 (SD 5.842) with a range of 76.14-94.32. The p value obtained in the Mann Whitney test was 0.091. Because the value of $p > 0.05$, it can be interpreted that there is no significant difference of both groups. As it can be seen in Tabel 5, all p values for subscales of motivation and total motivation were above 0.005, which means that there were no significant differences of motivation between control and experimental group.

Table 1. Charateristics of subjects

Characteristics	F	%
Sex		
Male	15	31.2
Woman	33	68.8
Age		
19	1	2.1
20	23	47.9
21	18	37.5
22	6	12.5

Table 2. Catheterization skill performances

Group	Students	Minimum	Maximum	Means	Standart Deviation
Control	25	82,35	100	95,06	4,856
Experiment	23	88,24	100	97,32	3,423

Table 3. Motivation

Motivation	Group	Students	Minimum	Maximum	Means	Standart Deviation
Interest	Control	25	61	100	88,14	10,849
	Experiment	23	71	100	90,53	9,364
Value	Control	25	75	100	92,78	7,815
	Experiment	23	81	100	93,12	6,426
Perceive	Control	25	50	83,33	70	9,239
	Experiment	23	58,33	91,67	73,73	8,374
Total	Control	25	70,45	93,18	85,09	6,915
	Experiment	23	76,14	94,32	87,01	5,842

Table 4. Analysis of performance

Group	N	Mean	Standart Deviation	*p-value*
Control	25	95,06	4,856	0,091
Experiment	23	97,32	3,423	

Table 5. Analysis of Motivation

	Motivational interest	Motivational value	Motivational perceived choice	Total Motivation
P value	0,477*	0,857*	0,151**	0,320*

Note : *Mann Whitney
**Independent T test

DISCUSSION

This research, whom participated by 48 preclinical students, was trying to compare 2 models of mannequin, the standardized and the low cost. It assessed performances and internal motivation, which is a new study in Indonesia. The total subjects involved are similar from previous researches at around 15 to 53 participants, although the amount of men are fewer than prior study (Nimbalkar, 2015). Whitney test obtained p value = 0.091 for differences in the performance value of catheter insertion skills of students. Therefore, the value of p> 0.05 can mean that there is no significant difference between the performance of catheter placement skills in the control group and the experimental group. Nimbalkar et al (Nimbalkar, 2015), stated that there is no significant difference in the value of written tests and skill tests between medical students given practicum using high fidelity mannequins with those not on neonatal resuscitation skills. The results that shows no differences between control and experimental group means that low cost mannequins provide the same sensation as standardized mannequin when used, so that it can also be used in learning. Moreover, the size of low cost mannequins is more suitable for Indonesians than standardized mannequins which are imported. In contrast to the research conducted by Crofts et al. (Crofts, 2006), which shows the use of high fidelity mannequin is better than those with low fidelity. However, participants in the study were trained to use high fidelity simulators and then their performance was evaluated, both to high fidelity and low fidelity simulators. This can lead to bias.

While the hypothesis test using the Mann Whitney test obtained p value = 0.320 for differences in the value of student motivation in student catheter installation skills. Therefore, the value of p> 0.05 can mean that there is no significant difference between students' motivation in practicing catheter placement skills in the control group and the experimental group. The absence of significant differences in terms of internal motivation may be due to the similar shape between the two mannequins without the addition of certain technologies that distinguish the two. However, the high mean of motivation of the experimental group compared to control group cannot be ignored.

This may be due to low cost mannequins appearing more recently and the use of replacement accessories that are more commonly found everyday as a tool to help attract participants to test them. Different results were obtained by Budiharjo et al (2015), that the use of mannequins using a sensor uterus significantly increased students' motivation in training bimanual examination skills. This may be influenced by the use of interesting learning media in the form of mannequins with the latest technology that trigger students' motivation.

Conclusions

Performance and motivation score of groups using low cost mannequins were higher than those using standardized mannequins, although statistical calculations were not meaningful.

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