Original Article

The Effect of One-To-One Education on Nursing Student's Realizing and Repeating Practices

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Abstract

Background: Professional skill laboratories in nursing education is provide students with opportunities to repeat practices and reduce their pre-clinic anxiety and fears**.**
AIMS: This study was undertaken to determine the effect of one-to-one and applied education done in an equipped laboratory upon status of student-nurses' realizing and repeating nursing practices, time to realize these practices and satisfaction with laboratory and clinic.
Methodology: The population of this interventional and descriptive study was composed of 181 first year students who studied at nursing school. The data were collected using an information form, skill checklists and form of satisfaction with laboratory and clinic. First; skill laboratory was equipped with mannequins, models, tools and equipment. Then; students were sorted into groups and each group practiced under the supervision of an instructor. Students were made to repeat the nursing practices in which they were wrong or incompetent until they became competent in these practices. After laboratory practices were completed, students were observed and assessed using 19 basic nursing practices according to checklist. Besides, students' status of satisfaction with both laboratory and clinic were assessed, too.
Results: Nursing practices in which students were successful in the second attempt were nasogastric catheter (58%), intramuscular injection (47%) and measuring blood pressure (32%).
Besides; time that a student spent for all of the 19 nursing practices was averagely 93.53 minutes and time that all of the 181 students spent for one practice was averagely 891.03 minute/14.85 hours. Students' general satisfaction score with laboratory was 4.44±0.69 for all practices whereas 4.86±0.47 with clinic (p=0.020).
Conclusions: Students repeated basic nursing practices three times at most at a high-fidelity skill laboratory. These repetitions and feedbacks affected their competence in practices and clinical practices positively. Students, spending averagely 5 minutes for each practice at laboratory, became satisfied with laboratory and clinical practices.

Key Words: Nursing practices, nursing students, simulations, skills, skill laboratory.

Background

Nursing education is given by a system where theoretical knowledge is put into practice. The first place where theoretical knowledge is put into practice in nursing education is professional skill laboratories (Cant & Cooper, 2010). The aim to use professional skill laboratories in nursing education is to provide students with opportunities to repeat practices, to reduce their pre-clinic anxiety and fears and to make them use theoretical knowledge in field by offering these students settings similar to clinical environments. Professional skill laboratories are settings where students improve their psychomotor skills and repeat practices thanks to mannequins and models or individuals without fear to harm patients and help these students gain self-confidence before they meet real patients and maximize their competence in clinical settings (Bradley & Postlethwaite, 2003; Morgan, 2006; Mete & Uysal, 2009; Gurol, Akpınar &Apay, 2016; Kahriman & Ozturk, 2016; Yılmaz, Korhan & Khorshid, 2017). Achieving competence and skills starts during first year at nursing school and continues until graduation. However; it is emphasized that the number of students at the schools where nursing education is provided is excessively high and practice opportunities are limited (Karaoz, 2003; Mitchell et al. 2009, Cato et al. 2009; Nulty et al. 2011) and applied education at laboratory during pre-clinic period is not sufficient and settings are poor (Swenty & Eggleston, 2011; Cant & Cooper, 2010; Bremner et al. 2006). Terzioglu et al. (2012) reported that students are not ready for clinics, studies done at laboratories are poor and they have difficulty turning theoretical knowledge into practice. Ability to realize patient care by the students, who are trained at professional skill laboratories that are poorly equipped, is limited and therefore, students do not gain knowledge and skills at a desired level (Aotearoa & Ousey, 2010; Baxter at al. 2009; Birol, 2013). However; building a fully-equipped professional skill laboratory, where new technological products and simulation methods can be used, provides students with real-life situations in a realistic learning atmosphere and improves their cognitive, psychomotor and behavioral knowledge and skills (Kapucu & Bulut 2011; Terzioglu et al. 2012). Not only proper laboratory settings but also individual education plays a key role in students' ability to gain desired knowledge, skill and behaviors because students can observe how a practice is performed, try new practices and make themselves acquainted with these new practices. Hence; it should be demonstrated to the students how a nursing procedure is performed, students should be made to perform the same procedure and they should be observed. Besides; the method with which the procedure is taught should be repeated at least a couple of times so that learning can be made permanent and competent (Hacıalioglu, 2013).

Preparing students for clinics at a professional skill laboratory, where a hospital-like setting is built, under the guidance of enough number of instructors using one-to-one teaching methods will help creating patient safety in clinical practices, improving communication skills and team understanding and will enable students to put theoretical knowledge into practice and -as a conclusion- maximize their satisfactions. These were the reasons to plan the current study.

This study was undertaken to determine the effect of one-to-one and applied education done with feedbacks in an equipped skill laboratory upon status of student-nurses' realizing and repeating nursing practices or skills and time to realize these nursing practices and skills. It was also aimed at determining satisfaction level with laboratory and clinic in relation with realizing these nursing practices and skills.

Methodology

This study was descriptive because status of student-nurses' performing nursing practices and their level of satisfaction with laboratory and clinic were explored; this study was interventional because practices were demonstrated at laboratory under the guidance of researchers and students were made to perform these practices and this study was cross-sectional because it was undertaken as a part of Fundamentals of Nursing Course II (FNCII) during Spring Semester of 2015-2016 Academic Year.

The population of this study was composed of 181 first year students who studied at a nursing school of a faculty of health sciences of a university and registered FNCII. The entire population was targeted without sampling and the study was

completed with the participation of 181 students. However; satisfaction assessment was made with 170 students after laboratory practice and post-clinic satisfaction assessment was made with 173 students.

The reason why the entire population was targeted in the study was that the study was done as a part of FNCII and that this course was basic to acquiring nursing skills. Therefore; the aim was to make all the students utilize laboratory opportunities and to explore effects of laboratory upon all the students.

Inclusion criteria were registered FNCII for the first time, never performing at nursing skill laboratory and never practicing at clinic, having completed theoretical part of the course and being first year student-nurse. Exclusion criteria were being on leave, being absent from the school and re-taking FNCII. To conduct the study, written institutional permission with 26.05.2015 date and ethical permission with 16.11.2015 date (Decision no: 2015/139) were taken from the related university.

Information Form (IF), Skill Checklists (SCs) and Form of Satisfaction with Laboratory (FSL) and Form of Satisfaction with Clinic (FSC) were administered. IF was used to explore students' socio-demographic characteristics. The form, designed by the researchers, involved six questions on students' age, sex, nationality, income status, school of graduation and reason to choose nursing school.

SCs were used to assess students for their laboratory and clinical practices. SCs were composed of 6 main topics, 19 nursing practices and 405 process-steps on vital signs, respiratory system, digestion system, urinary system and drug and hygiene practices (Table 1). SCs were prepared according to FNCII, the relevant book and the relevant literature (Berman et al. 2016; Craven, Hirnle & Jensen, 2013; Potter & Perry, 2013; Taylor et al. 2011) and SCs were discussed and finalized by seven experts on Fundamentals of Nursing. These SCs were designed in a way to assess students' ability to perform checklists, number of repetitions and time to repeat nursing practices.

FSL was used to evaluate students' status of satisfaction with models (6 items), consumables/devices/tools (6 items), group work (11 items), laboratory setting (9 items) in each practice in Table 1, their status to consider themselves competent after laboratory practices and their status of satisfaction with all laboratory practices. With the form designed by the researchers; students rated themselves with scores between 1 and 5 in terms of competence and satisfaction with laboratory practices. According to the form; as scores increased, so did seeing oneself competent and status of satisfaction with points between 1 (the worst) and 5 (the best). FSC was consisted of 5 questions (4 questions inquiring the level of success to perform all the FSL practices at clinic, the opportunity to perform practices, to achieve self-confidence and to improve communication with patients and 1 question addressing at general satisfaction with clinic). Students rated the questions related to practices with responses of "satisfied/dissatisfied" while general satisfaction with clinic was rated with points between 1 (the worst) and 5 (the best).

Study procedure: The study was consisted of three main phases.

Phase 1: The infrastructure of skill laboratory of FNCII was designed. This laboratory was equipped with enough consumables for each student, low-medium-high level technological mannequins and models, hospital technologies and other medical tools and devices and patient units with four patient beds, central aspiration and oxygen systems.

Phase 2: After theoretical part of FNCII was completed, 19 nursing practices were performed at laboratory by students (12 student groups of 15 students) according to checklist for five weeks (3 days or 24 hours a week) between the 14th of March and the 15th of April, 2016. These 19 practices were first demonstrated by instructors using mannequins or real individuals and then each student was made to perform each practice under the guidance of instructors. In the meanwhile, instructors took notes on skill checklists as to whether or not students completed checklists correctly by ticking true or false. Afterwards, instructor identified checklists that were wrong, incomplete or never performed and gave students

feedbacks. Instructor demonstrated checklists again and made students repeat these steps until they became able to perform them correctly and completely. During these steps, instructors recorded how many times each practice was done and how long (as second) it took to perform each practice. Finally, FSLs were handed out to students and collected on the 15th of April, 2016 after applied education at laboratory was finished.

Phase 3: Following laboratory practices, students performed clinical practices of the course at different clinics of three different hospitals in the same city between the 19th of April and the 18th of May, 2016 for five weeks. While students took advantage of opportunity to perform practices on real patients at clinics; instructors simultaneously observed them, recorded relevant findings about student's performance on skill checklists and wrote practice time down. However, those skills for which students did not have any chance to do were not evaluated. Finally, FSCs were distributed to the students and collected from them to explore their satisfaction with the effect of laboratory practices upon clinical practices at the end of clinic practice on the 18th of May, 2018.

The data were processed with SPSS 20.0 software package. To find students' socio-demographic characteristics; frequency, percentages, arithmetic mean and Wilcoxon test were employed. To assess the number of students' laboratory and clinical practices; percentages and numbers, arithmetic means were used whereas to explore satisfaction with practices; arithmetic means, numbers and percentages were used. To evaluate students' some demographic characteristics and their satisfaction status were used. The Wilcoxon test was used for the matched groups to determine the differences between the laboratory and clinic performance time and group' satisfaction. The data were evaluated at a 95% confidence interval and at a $p<0.05$ significance level.

Results

A 88.4% of the nursing students were aged ≤20 years, 74% of them were female, 74.6% of them graduated from Super/Anatolian high schools and 72.9% of them had an income equal to expenses. Besides, 38.7% of the students told to have preferred nursing school according to academic grades.

When students' status to perform and to repeat practices at laboratory environment was examined; students were least successful in inserting nasogastric catheter (39.2%) while they were most successful in giving a bed bath and oxygen saturation performance in the first attempt (98.3%). Accordingly; it was noted that most of the students failed in the first attempt but nursing practices in which students repeated for the second time were nasogastric catheter (58%), intramuscular injection (47%) and measuring blood pressure (32%). Nursing practices that students repeated for the third time were performance blood pressure (21%), measuring heart rate (6.1%) and counting breath rate (3.3%), intramuscular injection (3.3%), nasogastric catheter (2.8%) and taking blood sample (2.2%). As a result; students repeated 17 of the 19 nursing practices for the second time while 10 of the 17 nursing practices for the third time (Table 2).

When time that student-nurses spent to do these nursing practices at laboratory and clinic was investigated; at laboratory, they spent the minimum time (52.64±28.02) for oxygen saturation while they spent the maximum time (817.05±1116.55) for inserting male urinary catheter; however at clinic, students spent the minimum time (34.6±24.98) for measuring temperature while they spent the maximum time (2227.3±3998.5) for inserting female urinary catheter When average time that a student spent for performing one practice at laboratory was calculated, time spent for performing all of the 19 nursing practices was 5612.071 seconds or 93.53 minutes. In this sense, time that a student spent for doing one practice was averagely 4.92 minute and time that all of the 181 students spent for one practice was averagely 891.03 minute/14.85 hours. When time that student-nurses spent for laboratory and clinical practices was compared; it was found that there were statistically significant differences between clinical practice time and laboratory practice time in terms of measuring body temperature, blood pressure, heart rate and counting breath rate, oxygen saturation measurement, oxygen practice, aspiration, taking blood sample, subcutaneous injection, intramuscular injection, giving hair bath and bed bath practices ($p<0.05$) (Table 3).

Table 1. Skills and checklist numbers according to basic titles

Basic title	Skills	Check list numbers
Vital signs	Body temperature	9
	Blood pressure	11
	Pulse-respiration	18
	O_2 saturation	6
Respiratory system	O_2 practice	14
	Aspiration	18
Digestion system	Enema	23
	Blood sugar measurement	17
	Nasogastric catheter	31
Urinary system	Male urinary catheter	37
	Female urinary catheter	39
Drug applications	Intravenous	23
	Bloodletting	27
	Subcutaneous	17
	Intramuscular	26
	İntradermal	18
Hygiene practices	Oral care	17
	Hair-bath	28
	Bed-bath	26

Table 2. Skills of laboratory performances

Titles	Skills	Laboratory performances					
		Performance 1		Performance 2		Performance 3	
		n	%	n	%	n	%
Vital signs	Body temperature	164	90.6	17	9.4	--	--
	Blood pressure	84	46.4	58	32.0	38	21.0
	Pulse-respiration	117	64.6	51	28.2	11	6.1
	O2 saturation	178	98.3	3	1.7	--	--
Respiratory system	O2 practice	170	93.9	7	3.9	--	--
	Aspiration	172	95.0	9	5.0	--	--
Digestion system	Enema	164	90.6	14	7.7	1	0.6
	Blood sugar	162	89.5	16	8.8	1	0.6
	Nasogastric catheter	71	39.2	105	58.0	5	2.8
Urinary system (Urinary catheter)	Male	158	87.3	20	11.0	1	0.6
	Female	177	97.8	3	1.7	--	--
Drug applications	Intravenous	167	92.3	12	6.6	--	--
	Bloodletting	148	81.8	27	14.9	4	2.2
	Subcutaneous	141	77.9	37	20.4	1	0.6
	Intramuscular	89	49.2	85	47.0	6	3.3
	Intradermal	163	90.1	16	8.8	1	0.6
Hygiene practices	Oral care	175	96.7	3	1.7	--	--
	Hair-bath	177	97.8	--	--	--	--
	Bed-bath	178	98.3	--	--	--	--

It was found that students' general average satisfaction score with all laboratory practices was 4.44±0.69 whereas 4.86±0.47 with all clinical practices and the difference between average scores was statistically significant on behalf of laboratory practices. On the one hand; there were no statistically significant differences between students' average laboratory and clinic satisfaction scores in terms of measuring blood pressure, oxygen practice, intravenous injection and intramuscular injection ($p>0.05$); on the other hand, there were statistically significant differences between students' average laboratory and clinic satisfaction scores in terms of other practices ($p<0.05$). Satisfaction with laboratory was statistically significant in such practices as aspiration, enema, nasogastric tube insertion, male and female urinary catheter insertion, mouth and hair care, giving bed bath whereas satisfaction with clinic was statistically significant in measuring body temperature, measuring heart rate, counting breath rate, oxygen saturation, measuring blood glucose, taking blood sample and subcutaneous injection ($p<0.05$) (Table 4).

Discussion

A fully-equipped laboratory is highly important to the efficacy of education. Students prepare themselves for clinical practice by performing basic nursing practices at laboratories during pre-clinic period. Thus, students' clinical anxieties are minimized, patient safety is maximized and patient harm is prevented (Cant & Cooper, 2010). Therefore; it was thought in this study that it would be beneficial to assess status of student-nurses' realizing nursing practices and skills and its effects upon status of satisfaction at high fidelity skill laboratory renewed using one-to-one and applied education and feedbacks. Eker, too, emphasized that it is highly important that at laboratory, students should perform nursing skills and practices learnt in FNCII (Eker, Acıkgoz & Karaca, 2014). In this sense, it was seen that after having realized laboratory practices, most of the students became able to do oxygen saturation and bed-bath performance in the first attempt. Students understood and performed saturation measurement in the first attempt because oxygen saturation measurement is done by the device in seconds and check lists of saturation practice are shorter. Giving bed-bath is easy to understand because it is not a complicated practice despite time consuming. However, it was identified that students were unable to do such practices as measuring blood pressure, measuring heart rate and counting breath rate, intramuscular catheter insertion, nasogastric catheter insertion and taking blood sample in the first attempt. Some of the students were able to correctly do these practices only in the third attempt. Even if students follow the steps correctly in measuring blood pressure and measuring heart rate and counting breath rate, they may get wrong results when they cannot hear and feel beats; as a result of which students had to repeat the practice. In the study, students practiced on their friends using new sphygmomanometer and Dual Head Teaching Stethoscope. Instructors observed and assessed the students whether or not they were able to perform correct measurements using Dual Head Teaching Stethoscope. Students who performed incorrect measurements repeated until they did them correctly. Therefore, it was concluded that students needed more repetitions for measuring blood pressure. The reason why intramuscular catheter insertion was repeated three times may have been that injection site was big and difficulties to detect bone structures used for injection site occurred. Besides, a warning was given by model in case that injection site was incorrectly determined; which made students repeat this practice. As seen by these results, working with models that give a warning helped checking whether or not checklists were done correctly and whether or not products/outcomes were correct while assessing students. Thus, since both checklist to be followed and outcomes/products were evaluated, students were cross-checked. It is suggested that this kind of evaluation method is the most effective one (Boztepe & Terzioglu, 2013). Yet, there is a need for models that give responses and reactions. Half of the students were able to do nasogastric catheter insertion in the second attempt because of its long checklists. In taking blood sample, a few of the students were able to do this practice in the third attempt because students had to repeat this practice when blood did not come into tube due to technical problems.

It was found that at laboratory, it was oxygen saturation measurement that was done by the students in the shortest time while at clinic, it was

temperature measurement done by the students in the shortest time. Since tools/devices used at laboratory and clinic may be different, process time may change. There is almost no difference in duration of checklists. Urinary catheter insertion practice was the longest practice both at laboratory and clinic. Due to long checklists of urinary catheter insertion and its strict surgical asepsis rules, it was the practice that took the longest time to perform both at laboratory and clinic. Achieving practice perfection and competence maximizes practicality. Besides, using models at laboratory environment sometimes complicates nursing practices done on the real patients and makes process time longer.

When students' status of satisfaction with laboratory practice was examined; it was found that students' general satisfaction level was high. However; on models, students were least satisfied with oxygen practice whereas they were most satisfied with hair-care practice .Of mannequin satisfaction; 43.5% of the students received minimum total satisfaction score from mannequin on which oxygen practice was performed because they were not able to measure and determine the mannequin reaction whereas most of the students reported to have higher total satisfaction score from hair-care practice because it was easy to do. Mannequin on which oxygen practice was performed had old technology and low fidelity and therefore was not equipped with response/reaction feature; which may have affected students' satisfaction negatively. In the study of Terzioglu et al. (2012); it was suggested that students/practitioners should use advanced models and mannequins that can response in order to improve skills. In the study of Eker et al. (2014); it was identified that 66.7% of the students did not find laboratory environment suitable for practices while 87.3% of the students stated that they found models suitable for medical education and training. Besides, 95.2% of the students agreed that it made them learn better when they themselves realized the medical practice.

Although students regarded themselves competent in laboratory practices, they told that they found themselves the most skilled in measuring temperature while the least in intravenous catheter insertion. We are of the opinion that students found themselves the most skilled in measuring temperature because this medical practice took short time , was easy to use and did not lead to fear and anxiety . For us; the reason why students found themselves the least skilled in inserting intravenous catheter may have been that it was an invasive procedure, took time and did not provide any reaction and response since it was done on models.

When finding on students' clinical practices were assessed, it was seen that students were highly satisfied with the practices at clinic. It was identified that of clinical practices, students were most satisfied with measuring vital signs while least satisfied with nasogastric catheter insertion, male and female urinary catheter insertions. Low student satisfaction with nasogastric insertion and male and female urinary catheter insertions may have resulted from the possibility that the students did not have any chance to perform these practices at clinic. Yet, it was observed that students had the opportunity to measure vital signs, increased self-confidence and improved communication skills with patients. Vital signs are routinely measured at least twice at each clinic and therefore, it is the practice that students always encounter at clinic. Thus, repeating this practice often contributes to improving students' skills and self-confidence. Since nasogastric catheterization and male and female urinary catheterizations at clinic are complicated and invasive practices that are not performed often at clinics and require experience; students do not have much chance to do these practices. On the other hand, it is possible that students may feel incompetence in and stay away from these practices. It was also reported in the study of Calıskan et al. (2012) that at clinics, students found chances to measure temperature, heart-rate, breath rate and oxygen saturation and they found themselves competent in these practices whereas they did not get any chance to insert nasogastric catheter and urinary catheter and therefore they found themselves incompetent in these practices (Calıskan et al., 2012). Students can improve self-confidence and patient communication when they realize a medical skill for which they find any chance to perform. Repetitions for skill mastery increase student performance and self-confidence (Khalaila, 2014).

As a conclusion; students' performing 19 basic nursing practices with high-fidelity mannequins and models at a skill laboratory similar to hospitals

produced positive effects upon their competency in these medical practices, their adaptation into clinical practices and their satisfaction levels. However, almost half of the students recommend that high tech and high fidelity simulator mannequins and models be bought for laboratories since old tech mannequins and models do not respond nor react. Thus students' success and satisfaction will be maximized.

Acknowledgements

We extend our thanks to Karadeniz Technical University Rectorship, the nursing department student at 2015-2016 academic year who participated in this study and Research Assistant Esra CAYLAK.

The article is composed out of the project titled "Effects of Equipped Skill Laboratory on Clinical Practice and Psychomotor Skills of Nursing Students" with the code TAY-2015-94, supported and financed by Karadeniz Technical University Scientific Researches Projects (Researche Substructure Project 04).

Funding statement

The article is composed out of the project titled "Effects of Equipped Skill Laboratory on Clinical Practice and Psychomotor Skills of Nursing Students" with the code TAY-2015-94, supported and financed by Karadeniz Technical University Scientific Researches Projects (Researche Substructure Project 04).

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Table 3. Comparison of clinical and laboratory performance time according to skills of nursing students

Skills	Clinical performance time		Laboratory performance time		Z*	p
	n	X±SD	n	X±SD		
Body temperature	95	54.06±29.27	38	34.60±24.98	-5.543	0.000
Blood pressure	123	309.09±153.52	38	186.45±122.67	-7.660	0.000
Pulse and respiration	94	139.53±61.32	57	108.59±45.04	-4.517	0.000
O2 saturation	84	52.64±28.02	50	45.28±36.92	-3.220	0.001
Oxygen	79	176.50±58.69	23	107.404±68.796	-6.554	0.000
Suctioning	9	280.56±78.78	2	184.667±103.977	-2.045	0.041
Enema	5	236.40±133.93	9	265.714±113.998	-1.444	0.149
Blood glucose	34	125.28±74.43	30	127.600±92.024	-0.936	0.349
Nasogastric tube insertion	1	535.93±144.47	2	540.000±393.446	-0.535	0.593
Urinary tube insertion (male)	3	817.053±1116.55	1	525.000±502.892	-1.095	0.273
Urinary tube insertion (female)	1	625.419±165.65	7	2227.375±3998.504	-1.820	0.069
Intravenous catheter insertion	71	277.656±92.09	56	297.765±197.417	-0.841	0.400
Blood letting	92	217.735±77.93	33	163.900±103.660	-5.296	0.000
Subcutaneous injection	75	136.536±44.25	50	117.856±84.966	-2.571	0.010
Intramuscular injection	73	277.656±92.09	12	173.753±123.850	-6.542	0.000
Intradermal injection	-	121.412±40.47	-	-	-	-
Oral care	15	224.854±136.18	13	249.188±221.572	-0.239	0.811
Hair care	0	296.181±90.73	7	868.286±200.101	-2.366	0.018
Bad bath	3	707.523±276.29	10	1694.286±934.867	-2.764	0.006

***Wilcoxon Test**

Table IV. Comparison of clinical and laboratory satisfaction according to skills of nursing students

Skills	Satisfaction of Laboratory performance						Satisfaction of clinical performance							Total satisfaction	
	Mannequin	Tools	Teamwork	Laboratory	Sufficiency	Satisfaction	Opportunity of skills		Self-reliance		Communication progress		Satisfaction	Z*	p
	X±SD	X±SD	X±SD	X±SD	X±SD	X±SD	n	%	n	%	n	%	X±SD		
Body temperature	-*	4.72±0.52	4.71±0.59	4.70±0.54	4.57±0.66	4.45±0.72	171	98.8	163	94.2	164	94.8	4.86±0.47	-2.860	0.004
Blood pressure	-*	4.65±0.68	4.61±0.73	4.65±0.60	4.28±0.99	4.44±0.72	169	97.7	159	91.9	163	94.2	4.62±0.82	-0.260	0.795
Pulse and respiration	-*	-*	4.60±0.72	4.65±0.60	4.51±0.70	4.47±0.71	170	98.3	162	93.6	164	94.8	4.85±0.48	-5.156	0.000
O2 saturation	-*	4.75±0.54	4.70±0.51	4.64±0.60	4.54±0.68	4.46±0.71	162	93.6	157	90.8	158	91.3	4.81±0.63	-2.784	0.005
Oxygen	4.15±1.18	4.25±1.23	4.23±1.26	4.56±0.69	4.24±0.84	4.45±0.72	108	62.4	113	65.3	115	66.5	4.28±1.18	-0.799	0.424
Suctioning	4.34±0.79	4.57±0.68	4.54±0.70	4.58±0.70	4.22±0.85	4.45±0.72	30	17.3	40	23.1	36	20.8	3.07±1.73	-4.375	0.000
Enema	4.46±0.77	4.65±0.62	4.61±0.67	4.60±0.70	4.34±0.85	4.42±0.81	28	16.2	37	21.4	41	23.7	2.94±1.73	-4.967	0.000
Blood glucose	-*	4.25±1.34	4.51±0.93	4.62±0.63	4.44±0.73	4.45±0.72	160	92.5	152	87.9	155	89.6	4.70±0.77	-3.677	0.000
Nasogastric tube insertion	4.38±0.80	4.52±0.89	4.60±0.72	4.59±0.66	4.24±0.86	4.40±0.81	8	4.6	20	11.6	20	11.6	2.31±1.63	-5.434	0.000
Urinary tube insertion (male)	4.31±1.03	4.51±0.79	4.52±0.72	4.57±0.73	4.17±0.92	4.44±0.72	9	5.2	19	11.0	18	10.4	2.19±1.53	-5.416	0.000
Urinary tube insertion (female)	4.38±0.77	4.53±0.77	4.55±0.72	4.59±0.73	4.17±0.92	4.44±0.71	24	13.9	36	20.8	34	19.7	2.61±1.60	-5.862	0.000
Intravenous catheter insertion	4.17±1.06	4.01±1.51	4.48±0.85	4.63±0.65	3.98±1.09	4.40±0.78	147	85.0	144	83.2	145	83.8	4.31±0.94	-0.420	0.674
Blood letting	4.24±0.97	4.58±0.75	4.45±0.89	4.62±0.68	4.04±1.07	4.40±0.77	161	93.1	156	90.2	155	89.6	4.67±0.71	-3.486	0.000
Subcutaneous injection	4.43±0.84	4.56±0.85	4.46±0.87	4.56±0.78	4.15±0.94	4.42±0.73	155	89.6	151	87.3	148	85.5	4.66±0.74	-2.915	0.004
İntramuscular injection	4.34±0.87	4.58±0.76	4.49±0.87	4.60±0.66	4.11±1.01	4.40±0.77	143	82.7	141	81.5	139	80.3	4.52±0.89	-1.786	0.074
İntradermal injection	4.44±0.79	4.66±0.68	4.54±0.82	4.67±0.59	4.19±0.97	4.43±0.72	***-	***-	***-	***-	***-	***-	***-	-	-
Oral care	4.54±0.66	4.66±0.70	4.69±0.56	4.67±0.58	4.46±0.74	4.45±0.71	57	32.9	62	35.8	59	34.1	3.62±1.72	-3.671	0.000
Hair care	4.65±0.56	4.69±0.68	4.68±0.58	4.68±0.56	4.44±0.77	4.46±0.71	27	15.6	34	19.7	32	18.5	3.04±1.88	-4.559	0.000
Bad bath	4.59±0.66	4.64±0.68	4.68±0.59	4.61±0.69	4.48±0.76	4.46±0.71	28	16.2	35	20.2	33	19.1	3.13±1.85	-4.188	0.000
Total						**4.44±0.69**							**4.33±0.76**	-2.320	0.020

*Wilcoxon Test, **Mannequin not used, ***The students did not have to opportunity.