

Effect of stoma model based education on knowledge and skill levels of student nurses: a quasi-experimental study from Turkey

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Abstract

Objective: To determine the effect of education with a stoma model on knowledge and skill levels of student nurses.

Methods: The quasi-experimental study was conducted at a professional education and skills laboratory of the Nursing Department within a health sciences faculty in Turkey between March 2015 and November 2016. The sample comprised an experimental group that had students who took a surgical diseases nursing course during the spring, and a control group that had students who took the same course during the autumn. A student information form, a knowledge level evaluation form, and a skill level evaluation form were used data collection. SPSS 20 was used for data analysis.

Results: Of the 133 students, 69(52%) were in the experimental group and 64(48%) in the control group. It was determined that the skill level of the experimental group was higher than the control group ($p < 0.05$) and there was a positive correlation between knowledge and skill levels of student nurses in both groups ($p < 0.05$).

Conclusion: Education with a stoma model increased student nurses' skills and promotes their knowledge.

Keywords: Education method, Stoma care, Stoma model, Student nurses. (JPMA 69: 1496; 2019).doi:10.5455/JPMA.292930

Introduction

Nurses must possess the adequate knowledge and skills in order to provide the high-quality and safe care required and requested by patients. The acquisition of these skills must be completed during nursing education.¹ Student nurses possessing these skills thus allow for decreased morbidity and mortality, lower care costs, and increased patient safety.² However, factors such as the fear of making mistakes, a lack of self-confidence, challenges related to practising on patients, as well as a lack of appropriate patients and materials prevent student nurses from adequately acquiring these skills and knowledge.³ Intestinal stoma care is one application that requires student and in-service nurses to obtain sufficient knowledge and skill base.

An intestinal stoma, which is an opening of the bowel through the abdominal wall, is applied in cases such as colorectal cancer/trauma, and inflammatory bowel diseases, and is referred to either as a 'colostomy' if it involves the colon section, or as 'ileostomy' if it involves the ileum section.⁴ The 2016 report⁵ by the American Cancer Society states that colorectal cancer is the third most common type of cancer found in both women and men. According to the Health Statistics Yearbook of the Republic of Turkey Ministry of Health,⁶ colorectal cancer is the third most common type of cancer, with an

incidence rate of 13.8 per 100,000 among females, and 22.8 per 100,000 among males. However, there is no clear data regarding the number of cases involving intestinal stomas in Turkey.

Moreover, intestinal stomas have an extensive physiological and psychological impact on the patient. Individuals with intestinal stomas experience problems that negatively affect their quality of life, including physical problems such as eating disorders, involuntary release of gas and foul odour, diarrhoea, constipation, and peri-stomal complications, as well as psychosocial problems such as social isolation, loneliness, anxiety, denial, decreased self-respect, and the feeling of inadequacy.^{4,7}

Allowing individuals with intestinal stoma to cope with problems that they encounter and reducing such problems is related to educating them and ensuring that they acquire necessary skills prior to surgery.^{8,9} Nurses are able to reduce the problems experienced by individuals with intestinal stomas through high-quality and skilled care practices, patient education, frequent consultation, and regular patient follow-up.⁹

Previous studies have highlighted the importance of having the knowledge and skills¹⁰ and have noted that neither student nor staff nurses have the adequate knowledge and skills needed to deal with intestinal stoma care.^{11,12} Karadag et al¹⁰ reported that the rate of complications dropped from 60.5% to 9.3% in intestinal

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stoma patients who were followed-up and provided with regular consultation. Duruk and Ucar¹¹ reported that nurses had an inadequate level of knowledge regarding intestinal stoma care, and that 51.5% of nurses did not feel personally responsible for stoma care. Bagheri et al.¹² similarly reported that nurses did not have the knowledge required to provide care to intestinal stoma patients. Lim et al.¹³ emphasised that patients with intestinal stomas required comprehensive training from nurses. The nurses must have gained sufficient knowledge and skills in their education period to provide high-quality care. However, only a limited number of students gain this knowledge during their education.¹⁴ In Turkey specifically, this is due to factors such as a high number of students, lack of material in clinical fields and an insufficient number of academic teaching staff.¹⁵ Ünver et al.¹⁶ reported that 76.6% of student nurses who were given theoretical information could not provide the care for colostomy patients. It is recommended that various education methods be concurrently used in order to increase student nurses' skill base related to intestinal stoma care.²

Perceptual and behavioural educating techniques, such as providing theoretical information, using videos and/or online applications, and simulation laboratories, as well as having students perform care activities on models will help to increase student nurses' care skills.¹⁷ Sarabia-Cobo et al.¹⁸ used a low-fidelity mannequin in their study, and found this simulation method to be appropriate for educating student nurses about palliative care. Educational institutions do not always have high-tech facilities which allow students to acquire this education because of financial restraints. The use of low-fidelity models or mannequins in nursing education neither requires advanced technology nor it requires significant funding, and is recommended in order to help students gain the basic care skills.¹⁹ Although a stoma model is an economical and easy-to-find equipment, its effect on the process of gaining knowledge and skills of student nurses has not yet been studied.

The current study was planned to determine the effect of education with stoma model on knowledge and skill levels of student nurses.

Subjects and Methods

The quasi-experimental study was conducted from March 2015 to November 2016 in a professional education and skills laboratory of the Nursing Department within a health sciences faculty in Turkey. Permission was obtained from the Trakya University School of Medicine scientific ethics committee, Edirne, Turkey, as well as from the health sciences faculty.

The sample size was calculated with a 0.54 effect size, 0.05 error rate, and 85% power in accordance with literature.²⁰ The sample comprised students enrolled in a surgical diseases nursing course and who voluntarily participated in the study and provided verbal informed consent. The experimental group had students who took the course during the spring and were educated with the stoma model, while the control group had those who took the same course during the autumn and were not exposed to the stoma model.

For data-collection, student information, knowledge level evaluation and skill level evaluation forms were used. The student information form asked the student's age, gender, status of receiving information related to intestinal stoma care, and frequency of encountering with an intestinal stoma case.

The knowledge level evaluation form was prepared in accordance with literature,^{4,7} and evaluated the knowledge level related to intestinal stoma care. Before the knowledge level evaluation form was used for the study, five scientific experts on surgical nursing and stoma care were asked to assess the propriety of the questions. It was rated on a 1-4 scale; 4 = highly relevant, 3 = quite relevant, 2 = somewhat relevant, and 1 = not relevant.²¹ After ratings by the experts, item content validity index was calculated for each item and the value was determined between 0.80 and 1.00 for each item, indicating high content validity. This form consisted of 10 true-false questions. If the answer given to the item was true, it was scored as 1, and if the answer was either false or unanswered, it was scored as 0. The total score was converted to percentage. A preliminary application for the form was carried out with 10 students and it was ensured that there was no item which could not be understood. These students participating in the preliminary application of the form were not included in the study groups. A high score was considered as a high level of knowledge in the student nurses.

The skill level evaluation form was prepared by the researchers in accordance with literature,^{4,7} and was developed as a checklist in order to evaluate the skill levels of student nurses related to intestinal stoma care. This form consisted of 28 steps under three different sections according to the intestinal stoma care procedure, including pre-procedure (8 steps), procedure (15 items) and post-procedure (5 steps). In each step, two independent researchers scored the skill level of each student and recorded on the form as 2 if the student's skill level was good, 1 if the student's skill level was moderate, and 0 if the student's skill level was inadequate. The concordance of the two researchers was calculated and

the interclass correlation coefficient was 0.85, which was acceptable. The mean total and three sections' scores from the entire skill level evaluation form was calculated and converted to percentages. Higher total score indicated higher skill level of the subject.

In the theoretical section of the surgical diseases nursing course, the same researcher explained intestinal stoma care and introduced stoma care products to the students in both the experimental and control groups at a classroom for 35-40 minutes. Demonstration and presentation methods of teaching were used in this theoretical section. The presentation included the definition, nursing care, and complication management of intestinal stomas. Following the theoretical section, the same researcher demonstrated intestinal stoma care on a stoma model to students in the experimental group at the professional education and skills laboratory of nursing department for approximately 30 minutes. This practical section was not performed with the control group. The data collection stage began 15 days after the theoretical section. The laboratory was prepared by the researchers for intestinal stoma care on the stoma model and stoma care products were placed in way that each student could see. Students in both groups were taken into the laboratory one by one, where they filled out the student information and knowledge level evaluation forms, by following applied intestinal stoma care on the stoma model. Students worked through the case given as a scenario. The scenario of the study was:

"The female patient aged 52 years old has a descending colostomy for one week and has some problems with changing the colostomy bag. You are being asked to perform intestinal stoma care on this patient. The materials on the table are for you to use. Please pick and choose any of these items you want to take. Any feedback will be given to you during the intestinal stoma care. Please start your intestinal stoma care."

The application intestinal stoma care procedure was monitored by two independent researchers, and the skill levels of students were recorded on the skill level evaluation forms.

The data obtained was evaluated using descriptive analyses, the Mann-Whitney U test, and Spearman correlation analysis with SPSS 20. $p < 0.05$ was accepted as being the statistical significance level.

Results

Of the 133 students, 69(52%) were in the experimental group and 64(48%) in the control group. The overall mean age of the subjects was 20.03 ± 1.76 years. Of the total,

Table-1: Characteristics of student nurses.

Characteristics	Experimental group	Control group	Total
Age (years, M \pm SD)	19.66 \pm 1.38	20.38 \pm 1.99	20.03 \pm 1.76
	n %	n %	n %
Gender			
Male	11 (17.2)	9 (13.0)	20 (15.0)
Female	53 (82.8)	60 (87.0)	113 (85.0)
Status of receiving information related to intestinal stoma care			
Yes	52 (81.2)	19 (27.5)	71 (53.4)
No	12 (18.8)	50 (72.5)	62 (46.6)
Status of encountering with an intestinal stoma case			
Yes	36 (56.2)	22 (31.9)	58 (43.6)
No	28 (43.8)	47 (68.1)	75 (56.4)

M; Mean; SD: Standard deviation

Table-2: Comparison of knowledge and skill levels of student nurses.

	Control group	Experimental group	Test value
Skill level			
Pre-procedure	63.33 \pm 17.14	87.26 \pm 10.33	$p = 0.000$ $Z = -8.025^*$
Procedure	47.73 \pm 13.38	69.90 \pm 11.36	$p = 0.000$ $Z = -7.754^*$
Post-procedure	56.88 \pm 16.94	76.09 \pm 16.51	$p = 0.000$ $Z = -6.111^*$
Total mean	53.82 \pm 12.09	76.14 \pm 9.83	$p = 0.000$ $Z = -8.209^*$
Knowledge level			
Total mean	76.88 \pm 18.25	79.71 \pm 12.48	$p = 0.081$ $Z = -1.745^*$

* Mann-Whitney U test.

113(85%) were female, 71(53.4%) had previously received information regarding intestinal stomas, and 58(43.6%) had encountered an intestinal stoma patient (Table-1).

Mean pre-procedure score on the skill level evaluation forms was 76.06 ± 18.61 , procedure 59.24 ± 16.60 , and post-procedure 66.84 ± 19.24 . The mean score of the total skill level of the students was 65.40 ± 15.65 , and the knowledge level was 78.35 ± 15.53 .

In terms of skill levels, the mean scores of the experimental group in each section was significantly higher than the control group ($p < 0.05$). The mean score of the knowledge of the experimental group was higher than the control group ($p > 0.05$) (Table-2).

In terms of relationship between the knowledge and skill levels of the students in the two groups, there was a statistically significant, weak positive correlation

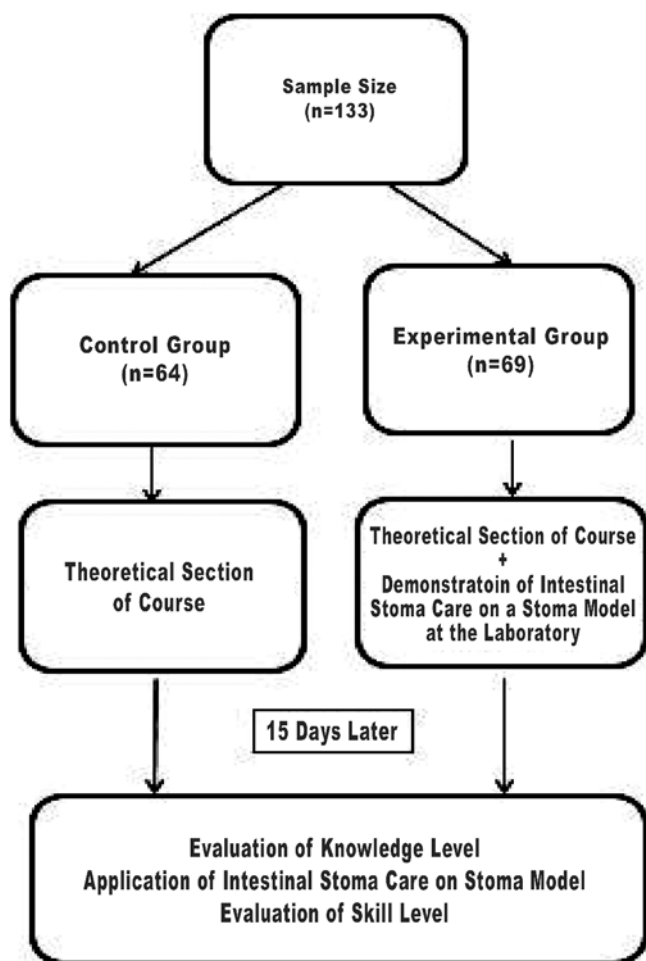


Figure: Flowchart.

($p=0.007$; $r=0.232$).

The characteristics of the subjects, such as age, gender, status of receiving information related to intestinal stoma care and encountering with an intestinal stoma case, did not affect skill and knowledge levels ($p>0.05$ each).

Discussion

The study determined that education with stoma model increased skill levels of student nurses related to intestinal stoma care. The mean skill score of student nurses in the experimental group who were educated with the stoma model was significantly higher than the control group. Subathra et al.²² studied the effect of stoma workshop on the knowledge skills of nursing students and found that knowledge score was increased after this activity. McDonough et al.²³ also determined the effects of hands-on training on stoma care and found it an effective activity to improve nursing knowledge. In Zimnicki and Pieper's study,²⁴ it was determined that providing simulation practice in training laboratory improved the

knowledge of the students related to stoma care.

With regards to studies on nursing education involving models, Türkmen et al.²⁵ found that student nurses who completed the basic life support course by practising on a model achieved an average skill score of 98.3 ± 1.6 out of 100. Gürol et al.²⁶ stated that using a model in parenteral medicine applications and blood pressure measurement increased skill levels. Wagner et al.²⁷ reported that students who were trained with a model had increased clinical skills. Smith and Hamilton²⁸ found that education with computer-aided simulation model was effective in acquiring skills in student nurses. The results of the current study and other studies show the effectiveness of using models in the improvement of the stoma as well as overall care skills of student nurses.

The current study found that student nurses in the experimental group who were educated with the stoma model had a higher knowledge level than the control group students, albeit statistically insignificant. Young Kim and Jung Kim²⁹ determined that student nurses who were educated with a model related to gastrointestinal bleed and compartment syndrome had higher level of knowledge than the control group.

The current study found that skill levels of the student nurses increased as their knowledge level related to intestinal stoma care increased. This result was also supported by findings of some studies. Josipovic et al.³⁰ found that skill levels of student nurses increased as their knowledge levels increased. Similarly, Cross et al.³¹ suggested that continuing education about ostomy care may increase the number of students' skills in clinical practices and knowledge scores. Maruca et al.³² also stated that ostomate simulation was beneficial to strengthen therapeutic relationships among nursing students and was a supportive educational activity.

The fact that the student nurses who participated in the current study received a traditional lecture from the same researcher during the course may have led to an overall high mean in terms of knowledge level for both experimental and control groups. This may be a limiting factor when comparing the results of the study with those of other studies.

Conclusion

Education with a stoma model increased student nurses' skills related to intestinal stoma care and promoted knowledge. We recommend using the stoma model in order to the increase stoma care skills of student nurses.

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Conflict of Interest: None.

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