

A Comparative Study on the Evaluation of Educational Materials for Appropriate Stoma Care Appliance Selection Based on Patient Conditions

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Abstract

Background

Poor stoma management can reduce a patient's quality of life. Therefore, nurses should have the knowledge on how to provide appropriate stoma care.

Aims

We aimed to evaluate educational materials developed based on the results of a survey conducted among nurses.

Methods

First, a first survey was conducted among 12 nurses to analyze their knowledge on stoma care. Next, a workshop using educational materials developed based on the results of the first survey was conducted. Subsequently, a second survey was performed after six months to evaluate the effectiveness of these educational materials.

Findings

The results of the first survey showed the areas where nurses lacked knowledge. Meanwhile, the results of the second survey demonstrated that images and photographs enhanced the learning effect of these educational materials.

Conclusion

The use of educational materials developed based on survey results and provision of learning opportunities improved nurses' stoma care knowledge.

Keywords: stoma care, educational materials, WOC nurse, evaluation, ostomates

Background

The Japanese government has issued physical disability certificates to individuals with disabilities to streamline the process of providing support and assistance to this population. Although the exact number of ostomates in Japan is unknown, more than 200,000 people have been issued with disability certificates as a result of bladder or rectal dysfunction (Report on Social Welfare Administration and Services, 2018). For many ostomates, one of the challenges with their condition is stoma management. Many ostomates have experienced excrement leakage from their brace. In many cases, excrement leakage from the ostomy appliance causes skin problems, which can lead to significant reduction in the quality of life (QoL). Additionally, reduced QoL can result in decreased motivation among ostomates to manage their condition, leading to delayed recovery (Aoki et al, 2017). Therefore, the nurses' ability to provide a

suitable stoma care method for their patients is crucial in the management of the condition. Previous studies have evaluated the use of a care algorithm (Aoki et al, 2017), care content checklist (Okamoto et al, 2013) and flow chart for appropriate system selection (McDonald, 2014) to improve stoma care education among nurses. Currently, few studies have examined the usefulness of educational materials that were developed based on the nurses' needs. This study was conducted at A Hospital, which is a 1000-bed cancer medical treatment cooperation base hospital in Japan. At the present, a 20-day clinical pass is issued in this hospital among patients who are hospitalized for stoma construction. In 2015, 60 patients were eligible for this clinical pass. The A Hospital has two registered skin excretion care nurses (wound, ostomy and continence [WOC] nurses). These WOC nurses care for the ostomates along with the nurses from the alimentary system

ward. Additionally, stoma care study sessions were held twice a year for nurses in this ward. However, these study sessions only lasted for approximately 30 minutes each and was not systematic. A nurse with experience in stoma 3 care served as the lecturer at these sessions. Of note, a number of nurses in this ward had limited experience with stoma care and, thus, could not provide proper stoma care to their patients. Therefore, educational materials were developed based on the nurses' specific needs.

Accordingly, this study aimed to evaluate the effect of these educational materials on the knowledge of nurses regarding stoma care.

Methods

Design

This study used a quantitative method and was conducted for nurses working in the alimentary system wards of the A Hospital. This study was conducted from December 2015 to July 2016. The data were collected in two phases (Figure 1). First, relevant documents were examined, and a Japanese self-completed questionnaire was developed. Subsequently, we conducted a survey to determine the nurses' knowledge regarding stoma care using this questionnaire (first survey). The first survey

comprised questions regarding the nurses' attributes and their stoma care knowledge. The questions on the nurses' attributes included the participants' sex and years of experience as a nurse in general and in the alimentary system ward. Stoma care knowledge was assessed based on three categories: stoma care appliances, stoma evaluation, and suitable appliance selection for the stoma state. The types of stoma care appliances include one-piece ostomy system, two-piece ostomy system, floating flange, and stationary flange. The stoma evaluation category comprised three items: height measurement range, standard height value and suitable body position for abdominal wall evaluation. Meanwhile, four subcategories were included in the category suitable appliance selection for the stoma state as follows: abdominal wall suitable for the appliance, flange suitable for the abdominal wall, plate suitable for the abdominal wall and appliance suitable for the case. Furthermore, we divided the subcategory abdominal wall suitable for the appliance into either tender or hard article. We also divided the subcategory flange suitable for the abdominal wall into either soft or round abdominal wall (flange). The subcategory plate suitable for the abdominal wall was composed of the following two items: neighboring wrinkles and cave-ins (plate) and

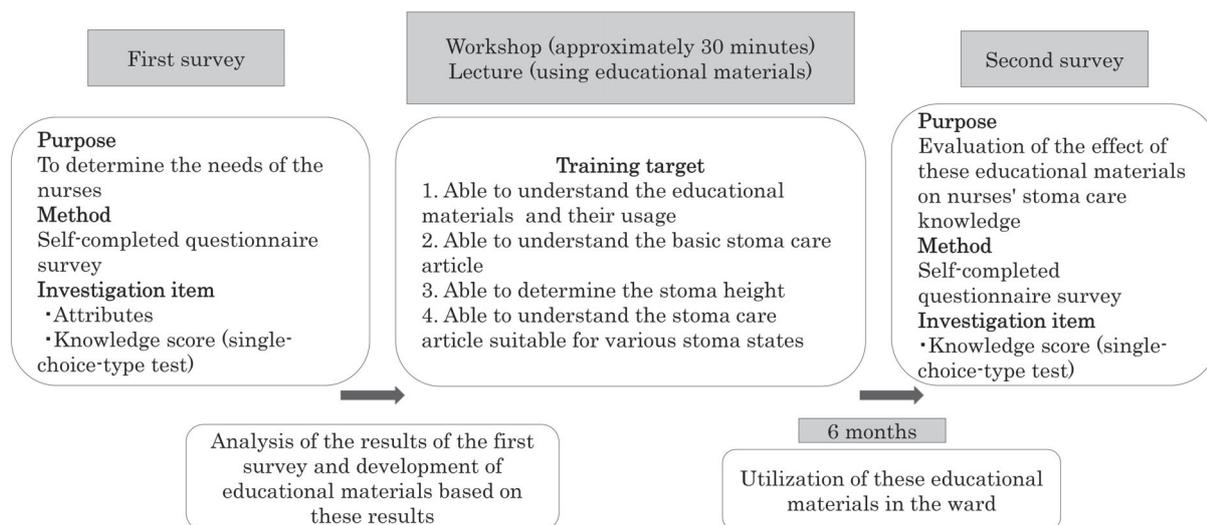


Figure 1 Collection of data from nurses in two phases.

Figure Legend

Figure 1: Collection of data from nurses in two phases. This study was conducted among 12 nurses in the alimentary system ward, and the data were collected in two phases from December 2015 to April 2016, that is, first and second surveys. The purpose of the first survey was to determine the needs of the nurses through a self-completed questionnaire survey. Following the achievement of the targets of the first survey, the effect of the educational materials on the stoma care knowledge was evaluated in the second survey.

near the arcuate line of the ilium and iliac spine (plate). Finally, the subcategory appliances suitable for the case included the following nine items: wrinkle on the hard abdominal wall, wrinkle on the soft abdominal wall, soft wrinkle, fixed wrinkle, soft abdominal wall, stoma without enough height and on the hard abdominal wall, stoma without enough height and with wrinkle and hollow, stoma with enough height and without wrinkle, and hollow to the extent that the convex article cannot be used on the extremely hard abdominal wall. The questions on stoma care knowledge included 22 items, which comprised a single-choice test. These 22 items were determined based on specialized journals review on stoma care. These items were exactly situations in which a nurse hesitate in selecting a suitable stoma care appliance. So, we incorporated these items into the questionnaire to determine stoma care knowledge among the participants.

We then calculated the correct answer rate for each question. A correct answer for each question is equivalent to one point. The accumulated points were subsequently calculated to determine the knowledge score of the nurses. Subsequently, we developed educational materials based on the data from the first survey. In brief, we considered the items with low correct answer rates in the first survey to reflect the nurses' needs. Our educational materials consisted of three items: the type and characteristics of the stoma care appliances, the height of the stoma, and examples of using the stoma state suitable appliances for the condition. In the item of the type and characteristics, the single-type orthosis and the two-type orthosis, the flange, and the face plate, their respective characteristics were presented with images and sentences. In the item of the stoma height, the measurement range and reference value were presented. And then, in the item of examples of using the stoma state suitable appliances for the condition, 11 cases were presented with images and sentences. Therefore, our educational materials aimed to improve the knowledge of these nurses with regard to these items. These educational materials were further refined based on specialized monthly journals (ABCD-Stoma, 2016; ABCD-Stoma

Care, 2016), namely, the WOC Nursing (IGAKUSUPPAN, Japan) and the Journal of Gastroenterological Surgery Nursing (MEDICUS SHUPPAN, Japan). Additionally, recommendations from the WOC nurses were extremely useful in the development of these materials. Consequently, we presented these educational materials to the nurses and provided them with an opportunity to learn about these materials through a workshop. Twelve target nurses attended a workshop on these educational materials, and these nurses then utilized these materials in the clinical setting. This workshop was instructed by a team of WOC nurses and researchers.

Six months later, we conducted the second survey using the same self-completed questionnaire to evaluate the effect of the educational materials developed based on the results of the first survey on the stoma care knowledge of the nurses.

Data and statistical analysis

The first and second surveys were conducted anonymously, and a distribution and collection survey method was used. The target nurses placed their completed questionnaires into a collection bag in their break room. They were given one week to complete the questionnaires. We calculated the basic statistics (average, standard deviation [SD] and median [Me]) of the provided data and compared the first survey with the second survey using a paired t test because normal distribution was confirmed for the knowledge score. Furthermore, we calculated the correct answer rate for the questions that assessed stoma care knowledge. We expressed the difference in the correct answer rates between surveys 1 and 2 as point (pt).

Ethical statements

This study was approved by the ethics screening committee of our university (ERB-E336-1). The study was thoroughly explained either verbally or in writing to the participants, and written consents was obtained thereafter.

Results

All 12 target nurses (100%) who participated in

this study were included in the analysis.

Attributes

The study participants worked as nurses in general for an average of 6.8 years (SD, 10.6; Me, 1.0) and in the alimentary system ward for an average of 2.3 years (SD, 2.3; Me, 1.0). In total, 8.3% and 91.7% of the participants were men and women, respectively.

Knowledge scores

The average knowledge score was 17.0 (SD, 2.1; Me, 17.0) and 19.2 (SD, 1.3; Me, 19.5) for the first and second surveys, respectively. The t-test demonstrated that a significant difference in the knowledge scores exists between the first and second surveys ($t = -2.721$, $df = 11$, $p = 0.02$), with a higher average knowledge score noted in the second survey compared with that in the first one (Table 1).

Correct answer rate

The correct answer rate for questions that assessed stoma care knowledge increased for 19 of the 22 items (Table 2). With regard to the stoma care system, the same correct answer rate was reported for all four items (one-piece ostomy system, two-piece ostomy system, floating flange and stationary flange). The first and second surveys showed rates of 92% and 100%, respectively, with a difference of 8pt. Therefore, the correct answer rate increased for all questions in the stoma care system category. In the stoma evaluation category, the correct answer rates for the first and second surveys were 42% and 83%, respectively, with a 41pt difference for the height measurement range; 50% and 83%, respectively, with a 33pt reference for the standard height; and 100% and 83%, respectively, with a -17pt difference for the suitable body position for abdominal wall evaluation. Thus, in the stoma evaluation category, the correct answer rate increased for the questions that assessed the height measurement range and

standard height value. However, the correct answer rate decreased for the questions that assessed the suitable body position for abdominal wall evaluation. For the subcategory abdominal wall suitable for the appliance under the category appliances suitable for the stoma state, the correct answer rates for the first and second surveys for tender article were 92% and 92% with no difference. And for hard article were 92% and 100% with an 8pt difference. Meanwhile, for the subcategory flange suitable for the abdominal wall, these values were 92% and 100% for the first and second surveys, respectively, with an 8pt difference for soft abdominal wall (flange) and 100% and 92%, respectively, with a -8pt difference for round abdominal wall (flange). For the subcategory plate suitable for the abdominal wall, the correct answer rates for the first and second surveys were 42% and 67%, respectively, with a 25pt difference for neighboring wrinkles and cave-ins (plate). And for near the arcuate line of the ilium and iliac spine (plate), they were 92% and 92%, respectively, with no difference for near the arcuate line of the ilium and iliac spine (plate). For the subcategory appliances suitable for the case, the following values were reported: 33% and 67% for the first and second surveys, respectively, with a 33pt difference for wrinkle on the hard abdominal wall; 42% and 75%, respectively, with a 33% difference for wrinkle on the soft abdominal; 75% and 92%, respectively, with a 17pt difference for soft wrinkle; 67% and 92%, respectively, with a 25pt difference for fixed wrinkle; and 67% and 33%, respectively, with a -34pt difference for soft abdominal wall. Moreover, under the same subcategory, the correct answer rates were 58% and 67% for the first and second surveys, respectively, with a 8pt difference for stoma without enough height and on the hard abdominal wall; 92%

Table1. Change of the knowledge score (n=12)

	Mean (Standard deviation)		Median (Interquartile range)		t value	df	p value
	First survey	Second survey	First survey	Second survey			
Knowledge score * 1	17.0 (2.1)	19.2 (1.3)	17.0 (18.8-16.0)	19.5 (20.0-18.3)	-2.283	11	0.022

* 1Number of items with the correct answer on the question that assessed 'knowledge about stoma care'. A correct answer for each question is equivalent to one point for that item, and we assumed it to be the 'knowledge score' (22 points is equivalent to the perfect score).

Table 2. Results of the first and second surveys and contents of the educational materials

Question item number	First survey (n=12)	Presentation method with the educational material				Second survey (n=12)		
		Correct answer rate (%)	Visual medium		Expository writing	correct answer rate (%)	Difference *1 (pt)	
			Picture	Photograph				Article
	First survey				Second survey			
Basic knowledge of stoma care								
Stoma care appliances								
1	One-piece ostomy system	92	—	○	○	○	100	8
2	Two-piece ostomy system	92	—	○	○	○	100	8
3	Floating-type flange	92	—	○	○	○	100	8
4	Fixation-type flange	92	—	○	○	○	100	8
The stoma evaluation								
5	Height measurement range	42	○	—	—	○	83	41
6	Standard height value	50	○	—	—	○	83	33
7	Suitable body position for abdominal wall evaluation	100	—	—	—	—	83	-17
Appliances suitable for the stoma state								
Abdominal wall suitable for the appliances								
8	Tender article	92	—	—	—	○	92	0
9	Hard article	92	—	—	—	○	100	8
Flange suitable for the abdominal wall								
10	Soft abdominal wall (flange)	92	—	○	—	○	100	8
11	Round abdominal wall (flange)	100	—	—	—	—	92	-8
Plate suitable for the abdominal wall								
12	Neighboring wrinkles and cave-ins(plate)	42	—	—	○	○	67	25
13	Near the arcuate line of ilium and iliac spine (plate)	92	—	—	—	—	92	0
Appliances suitable for the case								
14	Wrinkle on the hard abdominal wall	33	—	—	○	○	67	34
15	Wrinkle on the soft abdominal wall	42	—	○	○	○	75	33
16	Stoma without enough height and on the hard abdominal wall	58	—	—	—	○	67	8
17	Soft abdominal wall	67	—	—	—	○	33	-34
18	Fixed wrinkle	67	—	—	○	○	92	25
19	Soft wrinkle	75	—	—	○	○	92	17
20	Stoma with enough height and without wrinkle and hollow	92	—	—	○	○	100	8
21	Stoma without enough height and with wrinkle and hollow	92	—	—	—	○	100	8
22	Hollow to the extent that the convex article cannot be used on the extremely hard abdominal wall	100	—	—	—	—	100	0

*1: Difference in the correct answer rates: (correct answer rate in the second survey) - (correct answer rate in the first survey) = pt: percentage point.

and 100%, respectively, with an 8pt difference for stoma without enough height and with wrinkle and hollow; 92% and 100%, respectively, with an 8pt difference for stoma with enough height and without wrinkle and hollow; Therefore, in the category appliances suitable for the stoma state, the correct

answer rate increased for most items. However, the correct answer rate decreased for round abdominal wall (flange) under the subcategory flange suitable for the abdominal wall and soft abdominal wall under the subcategory appliances suitable for the case.

Discussion

In this study, we developed educational materials to enable nurses to select the appropriate stoma care appliance based on the patients' stoma state. Furthermore, we evaluated the effect of these educational materials on the stoma care knowledge of the nurses. The data obtained from the first survey showed that nurses need improvements in terms of determining the height measurement range and standard value of the stoma height. A previous study has demonstrated that the identification of the stoma height is crucial in providing appropriate stoma management (Egawa et al, 2013). Therefore, we included stoma pictures in the educational materials and clearly showed the measurement range and standard height value of the stoma in the pictures. Based on the results of the second survey, the correct answer rate for the stoma height increased, which indicated that the educational materials improved the nurses' knowledge on the standard height value and measurement range of the stoma. Therefore, we believed that the inclusion of pictures helped the participants to remember that information. Furthermore, the data from the first survey demonstrated that the nurses need to improve their knowledge on the selection of appliances suitable for the stoma state. A previous study reported that the selection of a wrong stoma care appliance is detrimental for the patient (Yoshida et al, 2017). Accordingly, a nurse must be able to select an appropriate stoma care appliance so that the patient can receive the most suitable management. Therefore, we searched for photographs of cases depicting situations that demonstrate the items with low correct answer rates for the first survey. Subsequently, we developed educational materials using those photographs of sample cases. Additionally, we included photographs of the 11 types of stomas, including a sample case of an item that had a low correct answer rate in the first survey, in the educational materials. We also wrote the name of the appliances suitable for each case and the stoma state beside each photograph. For the case depicting an item with a low correct answer rate in the first survey that lacked a photograph, we included an explanation regarding the stoma state and a suitable

appliance for it. Based on the results of the second survey, the correct answer rate increased for 19 of the 22 items, and the first survey showed higher knowledge score than the second one. The correct answer rate did not decrease in any of the items with photographs. Furthermore, the effect of using the visual medium was indicated in the educational material. These findings showed that these educational materials provided nurses with knowledge regarding the selection of appliances suitable for the stoma state. Moreover, the results showed that these educational materials as well as the images and photographs attached were effective in improving the nurses' knowledge. However, some items had a lower correct answer rate in the second survey, which included an item that is not included in the educational materials because it had a high correct answer rate in the first survey and another item that had no visual aspect in the teaching material. This result showed the importance of developing activities that encourage continuous learning, such as regular workshops, so that nurses can maintain their knowledge.

However, generalizing the results of this study is difficult as its target population is limited. Additionally, the effect of the stoma care educational program on nurses can vary based on their years of experience (Yoshida et al, 2017). Further, in this study stoma care knowledge was assessed based on three categories: stoma care appliances, stoma evaluation, and suitable appliance selection for the stoma state. These three categories were derived by us with reference to specialized journals on stoma care, and it cannot be said that the validity of the content has been thoroughly examined. Therefore, in conducting future surveys, it is necessary to prepare a questionnaire with due consideration of the content validity.

Also, the correct answer rate for questions that assessed stoma care knowledge decreased for 3 of the 22 items. Two of these three items had a correct answer rate of 100% in the first survey. This suggests that the knowledge acquired once needs to be repeatedly learned. For the remaining one item, the photos of the cases were not posted in the teaching materials compared to the items that had

the same correct answer rate in the first survey. This indicates the necessity of re-evaluation by trying to use visual media as teaching materials.

Therefore, the development of a versatile educational materials can be challenging and may require further research in the future.

Conclusion

Based on the results of this study that is conducted among 12 nurses at the alimentary system ward of the A Hospital, we conclude that the development of the educational 10 materials based on the needs of these nurses and provision of an opportunity to use these educational materials in the clinical setting were effective in improving the stoma care knowledge of the participants. Furthermore, the use of images and photographs in these educational materials and development of activities that promote continuous learning among nurses are also crucial in knowledge improvement. However, generalizing the results of this study is difficult because its target population is limited. Therefore, the development of versatile educational materials is a future challenge and may require further research.

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