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EFFECT OF SELF-CARE PROGRAM FOR PATIENTS USING COLOSTOMY AT MANSOURA CITY

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ABSTRACT

Background: Colostomy means an artificial opening of the colon onto the abdominal surface. It may originate from: The sigmoid colon, the descending colon, the transverse colon or the ascending colon. the colostomy need care so that the patients can determine self-care to prevent complications. **Aim:** Evaluate effect of self-care program for patients using colostomy at Mansoura City. **Design:** A quasi-experimental research design. **Setting:** Conducted at the Surgical Outpatients Clinic in Mansoura University Hospital. **Sample:** A purposive sample (40) colostomy patients. **Tools:** An interviewing tools was used in this study divided to three parts, 1) Socio-demographic characteristics, 2) Patients' knowledge regarding colostomy, and 3) Patients' reported self-care practices toward colostomy. **Results:** The present study results showed that patients' total score knowledge pre self-care program was 14.4040±9.15423, while after post self-care program it improved to 35.3200±6.9390. As well, the results showed that total score reported self-care practices pre self-care program was 6.320±6.735, which improved to 15.300±2.262 post self-care program, with highly statistically significant differences. **Conclusion:** The self-care program improved patients' knowledge and reported self-care practices toward colostomy. **Recommendations:** This study recommended that a further research is needed to investigate the long-term effect of such educational intervention on the health of patients with colostomy and should be carried out on a larger number of colostomy patients for evidence of the results and generalization.

Keywords: Self-care Program; Patients Using Colostomy; Mansoura City

INTRODUCTION

A colostomy is named according to where in the bowel it is formed. It may be an ascending, transverse, descending, or sigmoid colostomy. The type of waste is dependent on the site of the bowel used such as the waste in colostomy (ascending colostomy) is liquid to mushy and bad odor, while waste in right transverse colostomy is mushy to semi-formed and waste in left transverse colostomy is semi-formed and soft, also the waste in descending or sigmoid colostomy is soft to hard formed. Approximately 700,000 Europeans have had surgery opening in colon to remove damaged portions of colon. Colon cancer is essential cause to apply colostomy opening. Colon cancer cause 4% of all cancer deaths (Black & Matassarin-Jacobs, 2018).

The American Cancer Society showed that the colon cancer is the major cause of death between cancer patients in the United States, in 2016 the total of colostomy patients is 1,658,370 of 589,430 (SEER Cancer Statistics Fact sheets, 2017). 77% (n≈3000) of people in the United Kingdom undergoing anterior resection for colon cancer will have end stoma formed and 27% will still have a stoma at 18-month follow-up (American Cancer Society, 2019).

Colostomy is a surgery necessary when colon has been removed because of cancers tumors or other conditions. Colostomy often ends with a patient's stool leaving the body through the abdominal wall (Annual Statistics of the National Cancer Institute, 2017; Shariat, Milowsky & Droller 2009).

Colostomy surgery may be temporary or permanent ostomy, the patient facing several conflicts to deal with this opening. A colostomy is an artificial opening in the bowel that has been made to bring the bowel onto the

surface of the abdomen in order to divert the flow of stool. The colon cancer considers a significant serious health problem in the developing countries (Ferlay *et al.*, 2018). The colostomy may be due to noncancerous cause like due to prevention and treatment of colorectal complications, including anastomotic leakage and parastomal hernia, or cancer cause such as colon cancer, rectal and anal cancer (AlHussein *et al.*, 2015; Ferlay *et al.*, 2010).

Self-care program aids the patients with colostomy to apply care to him/herself. So, the nurse should be able to provide knowledge and teach practices for patients with colostomy, that support the patient to avoid complications and self-care themself after hospital discharge. The nurse provide health education about nature of disease. Colostomy care include: care of skin surrounding stoma; appropriate diet; inform the patients signs and symptoms of infection; abnormalities and to avoid complications; follow up visits at outpatient clinics; and how empty the colostomy bag and stoma care (Goldberg *et al.*, 2016; Luis *et al.*, 2017; Hugar *et al.*, 2016).

Significance of the Study

In Egypt, 7.8%, and 8 new cases per hundred thousand people per year complain from colon cancer (Khaled, 2019). The American Cancer Society estimated that 74,000 adults would be diagnosed with colon cancer by 2015 in the United States. It will be estimated that 16,000 deaths from colostomy infection (American Cancer Society, 2019; Leow *et al.*, 2018)

Above 85% of colon cancers are transitional cell in origin, while, in countries with high endemic parasitic diseases rates, such as Egypt, squamous cell carcinoma of the colon is more widespread (Nishikawa *et al.*, 2018). Egypt represents the 13th level around the world of cancer incidence and 10th level in cancer mortality also in Egypt 21.8% among standardized rate per 100.000 were diagnosed with colon cancer and 13.1% cancer mortality rate (Ferlay *et al.*, 2018).

The patients with colostomy faced conflict to care their stoma and that effect negatively in their psychological and physical status. So, the nurse play important role to teach these patients regarding the application of stoma opening self-care especially for patient complaining permanent colostomy (Zarzour *et al.*, 2008).

METHODOLOGY

Aim of the Study

The study was applied to evaluate the effect of self-care program for patients using colostomy at Mansoura City, Egypt.

Research Hypothesis

- Improvement in patients' knowledge regarding colostomy
- Improvement in patients' reported self-care practices regarding colostomy

Subjects and Methods

Research design

A quasi-experimental research design was utilized to achieve the aim of this study.

Setting

The study was conducted at the surgical outpatients' clinic in Mansoura University Hospital.

Sample

A purposive sample was used in this study. Patients diagnosed with colostomy at the surgical Outpatients' Clinics in Mansoura University Hospitals accounted for 400 patients in the year 2017-2018. The researchers selected 10% of them (40 patients for the main study sample, and 4 for pilot study) through the inclusion criteria: able to communicate and approved to participate in this study.

Tools of Data Collection

An Interviewing Tool Divided to 3 Parts

Part I: Questions regarding Socio-demographic characteristics: it included patient's age, gender, marital status, educational level, current occupation, monthly income, smokers, and residence place.

Part II: Patients' knowledge regarding colostomy, divided to: a) Patients' universal knowledge related to colostomy, such as: causes, signs and symptoms; preparations before colostomy surgery; exercise postoperatively; tubes will be applied after operation; immediate complications post operation, complications, warning signs to call physician immediately, normal range of stool elimination /day, and bowel elimination

problems after surgery, b) Patients' knowledge related to colostomy bag and care of the stoma, such as: importance of hand washing before and after care, importance of observing stool such as color, smell, quantity, and consistency every day, importance of disinfection of scissor used to cut out the circle on the wafer colostomy bag, important of observing skin around stoma, reason of bringing all supplies during care, determine about when to empty the pouch, and importance of the bag not to keep longer than seven days, c) Patients' knowledge regarding appropriate diet such as: the time allowed to eat after surgery, healthy diet appropriate for colostomy surgery, healthy diet that does not cause bad odor for stool, diet that does not cause constipation, diet that does not cause gas formation, the diet that does not cause indigestion, diets that help in wound healing, and importance of drinking plenty of fluids throughout the day post-surgery.

Scoring System: A correct and complete answer scored 2, while incomplete correct answer scored 1, and didn't know or incorrect answer scored zero. The total score for all questions related to knowledge was 52 grades. The scores of the items were summed and total divided by the number of all items giving a mean score. Knowledge was evaluated poor if the answers (<50%) scored from (0- < 25), while fair knowledge if the answers (50-75%) scored from (26-<39), and good knowledge if the answers (>75%) scored from (39-52).

Part III: Patients' reported self-care practices toward colostomy, such as: wash hands thoroughly using soap and water or use alcohol; gently take the pouch off; holding the skin with one hand, slowly ease pouch off using the built in tab for easier removal; check skin; check colostomy in general; clean stoma by using warm water and a dry wipe with mild soap on it; gently wipe around colostomy; also be sure to wash hands one more time before putting on the new pouch; use a skin barrier, such as colostomy powder; be careful not to put the powder on the colostomy itself. Carefully dust it around using a dry wipe; let the area dry for about 60 seconds; prepare the new pouch; use special disinfectant scissors to cut out the circle on the wafer; cut the wafer to fit the colostomy; place the wafer over the colostomy; begin pressing on the part of the flange located underneath the colostomy; gently moving to the sides and then to the top; once adhered, begin smoothing the flange to remove the creases; helps to form a tighter seal around the colostomy; hand washing after procedure.

Scoring System: 19 questions in this part, if the patient answer "Done" scored 1 and if answered "Not done" scored zero, the scores of the items were summed up and total divided by the number of all items giving a mean score. The total score was considered satisfactory if percent (<50%) (0 - <9) and unsatisfactory level if the percent score (50%) (10- 19)

Reliability

- Patients' knowledge regarding colostomy, Cronbach's Alpha was 0.85.

- Patients' reported self-care practices regarding colostomy care, Cronbach's Alpha = 0.82.

Validity

The study tools were evaluated by 7 experts from medical surgical nursing and community health nursing, Faculty of Nursing, Mansoura University and Ain Shams University; two Surgeon from Faculty of Medicine, Helwan University. Their opinions were elicited regarding the formats, layout, consistency, accuracy and relevance of the tool and accordingly modifications were done.

Pilot Study

A pilot study was conducted on 10% of subjects (4 patients) to test the applicability and feasibility of study tool as well as to evaluate the time needed to fill the tool. Obtained results were used as a guide to take into consideration the changes needed in the data collection tool and those sample who participated in the pilot study were excluded from the main study sample.

Ethical Considerations

The researchers acquainted the patients who participated in the study, then they gained an oral consent. Even though they approved to participate in the study, they were allowed to withdraw from the study at any phase without giving any reason; they were also assured that privacy of information, and data collected will be used only for the purpose of the study and their benefits.

Field Work

- Sampling and data collection were beginning and

completed within six months, from December 2018 to end of May 2019.

- The aim of study was simply clarified to patients who approved to participate in study previous to any data collection.

- The study was applied through four phases: assessment, planning, implementation, and evaluation.

Assessment Phase

- This was the first phase; the researchers welcomed the patients then introduced themselves to studied sample; the researchers collected socio-demographic characteristics from medical records as essential data, and then implemented a pretest questions to determine studied sample knowledge and reported self-care practices regarding colostomy.

- Data were collected from Mansoura University Hospital Outpatient Clinic by the researchers 3 days/week at morning shifts from 9.00 am. to 12.00 pm. The data were obtained individually by interviewing studied sample. The time spent to fill in the study tool was 20 minutes.

-A booklet and posters containing knowledge related to colostomy self-care was provided to patients.

-The self-care program was designed by the researchers, based on the results of assessment (pretest)

Planning Phase

- The self-care program was prepared by researchers based on analysis of the actual patients' requirements detected in pre assessment by using the pre-built tool.

-The self-care program was written in simple Arabic language that was proportionately related to literature to meet patients' requirements and their level of understanding.

-The self-care program was provided to patients through handouts and posters. It included figures, colored pictures which were primarily intended for attracting and guiding patients to actively participate in their self-care independently. The self-care was written in a simple way that could be understood easily by reader in self-learning.

- This self-care included two parts; theoretical part and practical part. The theoretical part covers the aim and care of colostomy.

Implementation Phase

- The self-care program was implemented to improve the subject knowledge and reported self-care practices regarding colostomy. It included:

- Patients' knowledge regarding colostomy as: important of hand washing before and after stoma care, important of observing stool for color, smell, quantity, and consistency every day.

- The self-care program was implemented in four sessions over a period of 6 months. The duration of each session ranged from 20 minutes, according to the knowledge of each session. The researchers met each patient individually and used some Medias as posters and simulation in practice sessions to increase attention. Also, sometimes the researchers provided counseling to patients through telephone calls.

- Each session started by a summary about what has been discussed in the previous session and gotten the aim of new session, the researchers using simple and clear language to be easy understandable by all patients with different educational levels.

- Each patient was made aware of the instructions given two times and the researchers used different methods of teaching including, brain storming, demonstration and re-demonstration. The researchers also were using colored poster. They distribute booklet to all patients. At the end of each session the patients determine the schedule of the next session.

Evaluation Phase

At the end of the sessions, the evaluation of the self-care program was done immediately post implementation regarding their knowledge and reported self-care practices using the same questionnaire that was used in the pretest and assesse status of the colostomy.

Statistical Design

Data collected were statistically calculated by using the Statistical Package for Social Sciences (SPSS), version 22, (SPSS Inc. Chicago, IL, USA). For quantitative statistics, the range, mean and standard deviation were measured. For qualitative statistics, which define a conclusive establishment of data by

frequency, percentage of each category. This was compared between pre and post program by using Chi-square test ($\chi 2$). Correlation between variables was estimated using Paired *t*-test. Significance was adopted at $p<0.05$ for interpretation of results of tests of significance (Dawso & Trapp, 2001).

RESULTS

Table 1: Distribution of Colostomy Patients Regarding Socio-Demographic Characteristics (N =40)

Socio-demographic characteristics	No.	%
Age		
20: ≤ 30 years	4	10
> 30: ≤ 40 years	7	17.5
>40: ≤50 years	10	25
>50 -	19	47.5
Mean ±SD 40. 0176 ± 5.6571		
Gender		
Male	38	95
Female	2	5
Marital status		
Single	3	7.5
Married	23	57.5
Widowed	6	15
Divorced	8	20
Educational level		
Illiterate	16	40
read and write	10	25
Primary education	6	15
Preparatory education	2	5
Secondary or diploma	2	5
University and postgraduate	4	10
Current occupation		
Not work	2	5
Housewife	2	5
Free work	14	35
Employee	5	12.5
Retired	17	42.5
Monthly income		
Sufficient and saved	3	7.5
Sufficient	8	20
Insufficient	29	72.5
Residence Place		
Rural	16	40
Urban	24	60

Table 1 showed that the mean age of studied patients was 40.0176±5.6571. Regarding patients' gender, 95% of studied sample were males, while 57.5% of them were married, and 40% of them were illiterates, as well as, the same table revealed that 42.5% and 72.5% of studied patients were retired and with insufficient monthly income respectively.

Table 2: Percentage Distribution of the Colostomy Patients' Correct Knowledge Regarding Colostomy Pre / Post Program (N=40)

Items	Patients n =40		
	Pre %	Post %	χ^2 *P*
Universal Knowledge, Through Determining the Following			
Information about colostomy	20	30	14.529 0.001*
Causes of colostomy	15	75	10.869 0.001*
Signs and symptoms of colostomy	10	50	14. 938 0.001*
Preparations before colostomy surgery	5	80	15. 842 0.001*
Exercise postoperatively	5	40	15.646 0.001*
Tubes will be applied after operation	15	60	18.708 0.001*
Immediate complications after the operation	10	40	3.148 0.490
Complications that may occur long -term after surgery	20	50	7. 629 0.943
Warning signs that call immediate contact with the physician	10	60	18.704 0.001*

Normal range of stool elimination per day	10	80	13.848 0.001*
Bowel elimination problems after surgery	10	50	12.277 0.001*
Knowledge Related Colostomy Care (Through Determining Importance of the Following):			
Important of hand washing before and after colostomy care	10	60	18.704 0.001*
Important of disinfectant of scissor used to cut out the circle on the wafer colostomy bag	15	70	17. 870 0.001*
Important of observing stool for color, smell, quantity, and consistency every day	20	90	14.588 0.001*
Important of observing skin around stoma during changing the colostomy bag	5	60	17.801 0.001*
Reason of bring all supplies are within easy reach	10	60	18.704 0.001*
Determine about when to empty the pouch	20	85	13. 658 0.001*
Important of the bag never stay longer than seven days	10	75	16.708 0.001*

**Significant (P<0.05)*

Table 2 revealed that, post program 75% of patients were rightly informed about causes of colostomy, in addition 80% of patients were informed about preparations before colostomy surgery, and 80% of patients were notified about normal range of stool elimination per day, ($P < 0.001$).

Table 3: Distribution of Colostomy Patients' Correct Knowledge Regarding Diet Pre/Post Program (N=40)

Items	Patients n = 40		χ^2 *P*
	Pre %	Post %	
The time allowed to eat after surgery	15	60	18.708 0.001*
Healthy diet that appropriate for this surgery	10	60	18.704 0.001*
Healthy diet that does not cause bad odor for stool	10	55	10. 727 0.001*
The diet that does not cause indigestion or dyspepsia	5	60	17.801 0.001*
Diet that does not cause gas forming	20	75	9.374 0.052
Diet that does not cause constipation	10	65	12.333 0.001*
Diets that help in wound healing	5	55	10. 542 0.001*
Importance of drinking plenty of fluids throughout the day postoperatively	15	60	18.708 0.001*

**Significant (P<0.05)*

Table 3 showed that, post program 75% of the studied patients knew about diet that does not cause gas formation and 65% of them knew diet that does not cause constipation, ($P<0.001$).

Table 4: Total Scores' Knowledge among Colostomy Patients (N=40)

Total Knowledge	Total Knowledge of the studied subjects pre and post program (n=40)				
	Pre		Post		χ^2 *P*
	No.	%	No.	%	
Total Knowledge levels:					
Poor (<50%) (0 :<25)	38	95	5	12.5	13. 537 0.001*
Fair (50-75%) (26:< 39)	2	5	19	47.5	
Good (>75%) (39:52)	0	0	16	40	
Range (0-52) Mean ± SD	(0-24) 14.4040 ± 9.15423		(28-52) 35.3200 ± 6.9390		
Paired *t*-test *P*	16.650 0.001*				

**Significant (P<0.05)*

Table 4 represented that total scores' of knowledge among patients regarding colostomy the Mean±SD pre-program was 14.4040±9.15423, which improved to 35.3200±6.9390 post program implementation respectively, *P*<0.001.

Table 5: Distribution of Patients' Reported Done Self-Care Practices Regarding Colostomy Care Pre / Post Program (N=40).

Items	Patients n =40		
	Pre %	Post %	χ^2 *P*
Wash hands thoroughly using soap and water. If this is not possible, use alcoh ol	30	85	17.953 0.0001*
Gently take the pouch off	10	75	16.708 0.001*
Holding the skin with one hand, slowly ease the pouch off using the built -in tab for easier removal	75	90	4.028 0.44
Check the skin	45	85	8.917 0.0001*
check the colostomy in general	45	90	5.182 0.031
Clean the stoma by using warm water and a dry wipe with mild soap on it	70	85	3.207 0.44
Gently wipe around the colostomy	25	85	11.952 0.001*
Also be sure to wash hands one more time before putting on the new pouch.	15	85	10.154 0.001*
Use a skin barrier, such as colostomy powder	25	75	10.327 0.001*
Be careful not to put the powder on the colostomy itself. Carefully dust it around using a dry wipe	5	80	15.842 0.001*
Let the area dry for about 60 seconds	10	75	16.708 0.001*
Prepa re the new pouch	15	80	9.689 0.001*
Use special disinfectant scissors to cut out the circle on the wafer	20	65	9.574 0.001*
Cut the wafer to fit the colostomy	25	75	10.327 0.001*
Place the wafer over the colostomy	30	85	12.472 0.001*
Begin pressing o n the part of the flange located underneath the colostomy	80	95	4.954 0.023
Gently moving to the sides and then to the top	20	70	9.896 0.001*
Once adhered, begin smoothing the flange to remove the creases. Doing this helps to form a tighter seal around the colostomy	25	80	12.987 0.001*

**Significant (P<0.05)*

Table 5 showed that there were no statistically significant differences among the studied patients regarding colostomy care pre/post program, $P>0.05$ at all items except; holding the skin with one hand, slowly ease the pouch off using the built in tab for easier removal; clean the colostomy by using warm water and a dry wipe with mild soap on it; and begin pressing on the part of the flange located underneath the colostomy.

Table 6: Distribution of Patients' Reported Done Self-Care Practices Regarding Colostomy Care Pre / Post Program (N=40)

Items	Patients n =40		
	Pre %	Post %	χ^2 P
Wash hands thoroughly using soap and water. If this is not possible, use alcohol	30	85	17.953 0.0001*
Gently take the pouch off	10	75	16.708 0.001*
Holding the skin with one hand, slowly ease the pouch off using the built-in tab for easier removal	75	90	4.028 0.44
Check the skin.	45	85	8.917 0.0001*
check the colostomy in general	45	90	5.182 0.031
Clean the stoma by using warm water and a dry wipe with mild soap on it	70	85	3.207 0.44
Gently wipe around the colostomy	25	85	11.952 0.001*
Also be sure to wash hands one more time before putting on the new pouch	15	85	10.154 0.001*
Use a skin barrier, such as colostomy powder	25	75	10.327 0.001*
Be careful not to put the powder on the colostomy itself. Carefully dust it around using a dry wipe	5	80	15.842 0.001*
Let the area dry for about 60 seconds	10	75	16.708 0.001*
Prepare the new pouch	15	80	9.689 0.001*
Use special disinfectant scissors to cut out the circle on the wafer	20	65	9.574 0.001*
Cut the wafer to fit the colostomy	25	75	10.327 0.001*
Place the wafer over the colostomy	30	85	12.472 0.001*
Begin pressing on the part of the flange located underneath the colostomy	80	95	4.954 0.023
Gently moving to the sides and then to the top	20	70	9.896 0.001*
Once adhered, begin smoothing the flange to remove the creases. Doing this helps to form a tighter seal around the colostomy	25	80	12.987 0.001*
Hand washing after the procedure	65	85	18.487 0.0001*

**Significant (P<0.05)*

Table 6 revealed that improvement in total scores reported self-care practices among colostomy patients regarding colostomy care post program, ($P<0.001$).

Table 7: Total Scores Reported Self-care Practices Among Colostomy Patients Regarding Colostomy Care (N=40)

Total Reported Self-Care Practices	Total Reported Practicecolostomy Patients pre and Post Program (n=40)				
	Pre		Post		χ^2 *P*
	No.	%	No.	%	
Total reported Practice levels:					
Satisfactory (<50%) (0 - <9)	8	20	38	95	0. 973 0.001*
Unsatisfactory (50%) (10 - 19)	32	80	2	5	
Range (0 -19) Mean±SD	0-9 6.320±6.735		10-19 15.300±2.262		
Paired *t*-test *P*	0. 884 0.001*				

**Significant (P<0.05)*

Table 7 represented that there were positive significant correlations between total scores of patients' knowledge and reported self-care practices among the studied patients pre / post program implementation, (*P*<0.001).

Table 8: Correlation between Total Score Knowledge and Total Score Reported self-care practices of Colostomy Patients Pre/Post Program (N=40)

Variables	Total score reported practice					
	Pre			Post		
	Paired *t*-test	Mean ± SD	*P*	Paired t-test	Mean ± SD	*P*
Total knowledge scores	7.854	6.102000 ±10.313540	0.001*	26.078	22.02000 ± 6.252402	0.001*

**Significant (P<0.05)*

DISCUSSION

A colostomy is a path that goes from the large intestine to the outside human abdomen. This helps solid waste and gas exit the body without passing through the rectum. The waste was collected in a pouch worn outside of human body. Before colostomy surgery the nurse and surgeon should be showed the best location for stoma, to let the patient be able see it easily and can take care of it by him/herself (Gacci *et al.*, 2013).

The current study was conducted to evaluate the effect of self-care program for patients with colostomy, the results in the present study showed that, 47.5% of studied sample aged 50 years or more. This study finding cleared that 95% of studied sample was male, while 57.5% of them were married, and less than half (40%) of them were illiterate. These results agree with those of Elhoty, (2017), who conducted a study on surgery departments and outpatient clinics at Al Qasr Al Aini Hospital, and reported that 85% of his studied sample was aged more than 50 years, males, and married, also the study was going in the same direction of the current study as it showed that half of study sample was illiterate.

Regarding the studied sample current occupation, this study result showed that more than half (42.5%) of the sample was retired. This finding was consistent with that of Sack *et al.*, (2016) which reported that 82% of their studied patients were retired.

The present study result showed that more than three quarters of studied sample reported that they had insufficient monthly income. This result disagrees with that of Klaassen *et al.*, (2016), who found that 53% of patients under study were in average economic status.

Concerning smoking, the current study finding discovered that 50% of the studied sample was smokers. This finding was corresponding with that of Miller *et al.*, (2016) conducted in America showed that, 50% of their studied subjects were smokers. The researchers' views

that smoking was one of the causes of colon cancer.

Regarding patients residence, the present study result revealed that two thirds (60%) of them were living in urban areas, this result agrees with that of Elhoty, (2017), who found that 61.7% of his studied sample was residing in urban areas, also it is incongruent with that of Mohamed, (2018), who found 82% of the studied sample was living in urban areas.

Considering patients' knowledge toward colostomy post self-care program implementation, the present study results showed that, three quarter (75%) defined the causes of colostomy, in addition majority (80%) of them were informed about preparations before colostomy surgery. This result was in accordance with that of Abufaraj *et al.*, (2016), who reported that, 73% of studied sample improvement in the patients' knowledge post program toward causes of colostomy. These results were congruent with those of Large *et al.*, (2018), who carried out a study, at United States of America, who reported that, an improvement in the patients' knowledge post program regarding preparations before colostomy surgery. The researchers noted lack of knowledge about these items before program which improved post program in most of the items.

Related to patients' knowledge regarding appropriate diet for colostomy patients, the finding of current study discovered an improvement in their knowledge post program with highly statistically significant differences in some items. This result is in line with that of Gregg *et al.*, (2017) which reported an improvement in the patients' diet and knowledge post program than before with statistically significant differences.

The current study presented that the Mean±SD of patients' total scores' knowledge regarding colostomy post program improved than pre-program, with highly statistically significant difference. This finding was in agreement with that of Mohamed *et al.*, (2017) who in a very recent study conducted at the Surgery Unit of The General Surgical Department and Outpatient Clinic in Benha Teaching Hospital, mentioned an improvement of patients' total score knowledge post program, combined with highly statistically significant differences.

Regarding patients' total scores reported self-care practices regarding colostomy care, the present study results showed that, there was an improvement in patients' total scores reported self-care practices regarding colostomy care post program. This result corresponds with, that of (Nygren *et al.*, 2019) who showed that, total scores' practices regarding colostomy care improved post application program, with highly statistically significant difference. The researchers attribute differences in the finding to insufficient patients' knowledge regarding colostomy care before program implementation and its improvement post implementation.

With reference to correlation between total scores of patients' knowledge and total score reported self-care practices regarding colostomy, the current study finding presented that there were positive significant correlations between total scores of patients' knowledge and reported self-care practices pre/post program. These results were similar with Ahmadi *et al.*, (2016) in their study that revealed positive significant correlation between total scores of patients' knowledge and practices. Similarly, Nazmy *et al.*, (2014) studies in Indiana City, found positive correlation between total scores of patients' knowledge and practices post program, also these results were congruent with those of Al-Maskari *et al.*, (2017). This study revealed positive significant correlation between total scores of patients' knowledge and practices.

CONCLUSION

According to the current study results and research hypothesis, the present study revealed that there were statistically significant improvements in post self-care program implementation regarding all items of colostomy patients' knowledge than pre-test. As well, there were improvements in the studied sample reported self-care practices toward colostomy care post self-care program than pre, with highly statistically significant differences.

Recommendations

- Periodic implementation of the designed self-care guideline booklets for patients with cancer in the clinics, outpatients and hospitals at patients' admission to provide them with the necessary and required knowledge and self-care practices about their disease is mandatory.

- Further research is needed to investigate the long-term effect of such educational intervention on the health of patients with colostomy and should be carried out on a larger number of colostomy patients for evidence of the results and generalization.

Conflict of Interests

The authors declare that they have no conflict of interest.

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