Effect of Educational Program on Self-efficacy and Peristomal Skin Complications for Patients with Permanent Colostomy

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Abstract

Background: ostomy is a life-altering event. New colostomy patients encounter many obstacles as they learn to live with their stoma. Studies have showed that ostomy patients who receive training are better able to live with their condition, and see an improvement in their physical and psychological well-being **Aim of the study:** The aim of the study was to evaluate the effect of educational program on self-efficacy and peristomal skin complications for patients with permanent colostomy. **Research design:** Quasi-Experimental design was utilized in this study. **Setting:** The study was conducted in surgical outpatient clinic at Zagazig University Hospitals. **Sample:** A purposive sample included 60 patients with permanent colostomy. **Tools:** Four tools were developed to collect data; patient interview questionnaire, self-reported practice, peristomal skin assessment scale and Stoma Self-Efficacy Scale. **Results:** There was a statistically significant improvement of patients' knowledge and practice and self-efficacy as well as decrease severity of peristomal skin complication between pre, post and post three months after implementing the educational program **Conclusion:** The study concluded that the educational program is effective in improving colostomy patients' knowledge and practices, their self-efficacy. **Recommendations:** Colostomy patients should receive a planned educational program before their discharge.

Keywords: Colostomy, Educational program, Self-efficacy.

Introduction

Colorectal cancer (CRC) is the third most commonly diagnosed cancer globally and the fourth leading cause of cancer-related death. CRC affects both sexes, all racial and ethnic groups, and is most common in people over the age of 50**. (Bond et al., 2017).** Colorectal cancer is the seventh most prevalent cancer in Egypt, accounting for 3.47 percent of cancers in men and 3 percent of cancers in women. Colorectal cancer strikes people of all ages, with young people being affected by more than one-third of tumors. The early detection of condition lowers CRC mortality and frequency **(Elkeleny, Abdelbaki, Sabry & Sharaan, 2021).**

Abdominoperineal surgery with colostomy remain the standard surgical technique for many colorectal cancer patients. Colostomy is a surgical procedure that creates an abdominal opening in which a part of the colon is transferred outside the abdominal wall to form a stoma in which digested foods passes into an external pouching system, and can be temporary or permanent **(Canadian Cancer Society, 2021).**

Stoma affects every aspect of patient's lives; including physical, social, psychological, spiritual and sexual, and causing problems in these aspects including; bowel irregularities such as constipation and diarrhea, bad odor, excessive gases, fear of leakage, sleep patterns disturbances, anxiety, depression, body image changes, and low self-esteem. Patients with colostomy may encounter changes in their daily life, particularly in their social network (at work and leisureliness time) and in their sexuality, triggering feelings of insecure and fear of rejection **(Ayaz-Alkaya, 2019)**

Patients following colostomy face numerous complications. Associated issues with colostomies can be local or systemic, early or late, intermittent or progressive. Bleeding, erosion, tissue over growth, stomal necrosis, peristomal skin discoloration, retraction, prolapse, stenosis, parastomal hernia, wound infection and parastomal abscess are example of local complications. While systemic complications include weight loss, malnutrition, electrolytes imbalance, or even death may occur. The majority of complications can be avoided by adequate preoperative preparation, sound surgical procedure and a good rehabilitation to psychologically prepare the patient **(Haque et al., 2021)**

Stoma care self-efficacy is the belief of colostomy patients that they can effectively manage their stoma to reduce negative effects (**Tao, Songwathana, Isaramalai & Wang, 2014**). Self-efficacy plays a significant part in the development of stoma adjustment; handle daily stressors with confidence and take necessary action to maintain and regain higher levels of self-efficacy immediately following surgery indicate better stoma coping and management, as well as fewer psychosocial issues throughout the first postoperative year (**Machado, Telles, Costa-Silva, Reis, & Barreto, 2016; Summers, 2018**).

The surgical nurses play a vital role in the care of colostomy patients to assist them adjust to the life rapidly after surgery (**Heerschap & Duff 2021**). Nurses participate in the preoperative and postoperative stoma patients teaching. Nurses act as educators during preoperative period by introduce the postoperative needs and the appearance changes and lifestyle recommendations (**Burch, 2017**). The patients also given support and information from everyone involved in their management Post-operatively and discharge from hospital, the process of living as a patient with an ostomy begins. This process can be assisted by the teaching of self-care, using devices and the clinical support to control complications, and treatment that allows the patient to fulfill family, work, and social responsibilities and return to relationships, hobbies, activities, and improving lifestyle is a very important priority in the treatment and care of colostomy patients (**Fitzmorris & Balart, 2021**).

Significance of the study:

According to data obtained from Zagazig University Hospitals between the years 2020 and 2021, it was found that approximately (75) cases with colostomies attended the surgical outpatient clinics for follow-up (Zagazig University Hospitals records, 2020). Moreover, the number of people with stomas has been raising in recent years. The persistence of a stoma has negatively impacts patients' physiological status, social adaptability, psychological status and lowers their quality of life. Furthermore, ostomy patients generally have little knowledge and self-management related to stoma care. Provide effective and positive education can help patients improve their self-care skills (**Faury et al., 2017**). Thus, the study was conducted to evaluate the effect of educational program on self-efficacy and peristomal skin complications for patients with permanent colostomy.

Aim of the study

This study aimed to evaluate the effect of educational program on self-efficacy and peristomal skin complications for patients with permanent colostomy.

Research Hypothesis:

Patients knowledge and practice score could be improved post implementing the educational program compared to pre implementing educational program.

Patients self-efficacy score could be improved post implementing the educational program compared to pre implementing educational program.

Patients peristomal skin complications could be reduce post implementing the educational program compared to pre implementing educational program.

Subject and Methods

Research Design

Quasi -experimental research design (pre and post) was used to conduct this study.

Setting:

The study was conducted in the surgical outpatient clinic at Zagazig University Hospital.

Subjects:

A purposive sample of 60 patients with permanent colostomies. The patients were selected according to the following inclusion criteria: Adult patients between 18 and 60 years of both sexes who are able to communicate and agreed to take part in this study.

Exclusion Criteria Patients with terminal illness and patients with physical, and psychological disabilities and patients who are unable to take care of themselves.

Sample size:

Slovin's sampling formula was used to determine the sample size of the study population. Where, n=sample size, N= number of total populations, e= Error margin of 0.05 at a 95% confidence interval.

The total population is 75, thus according to the formula:

n=N/1+ (N) (E) 2n=75/1+ (75) (0.05) 2

n=75/1+ (75) (0.0025)

n= 75/1+0.25 n= 75/1.25 n= 60.

Tools of data collection

The following tools were used to collect data for this study:

Tool I: Structured interviewing questionnaire: It was created by the researcher after reviewing the related and recent literature **(Salomé & De Almeida, 2014 & Sousa et al, 2 0 1 6)** It included two parts:

Part (1): Patients demographic and clinical related data as age, sex, marital status, educational level, residence, and occupation, causes of colostomy, smoking and family history.

Part (2): Patients' knowledge regarding colostomy care. This part was developed to assess the knowledge level regarding colostomy care. It included thirty multiple choice questions: 2 questions on the definition and causes of colostomy, question on the health characteristics of colostomy, 8 questions on complications of colostomy and their management, 5 questions about diet, 8 questions about daily activity (bathing, travelling, sexual relation, religious practices and exercise),4 questions about colostomy care and 2 questions about follow-up visit. For knowledge scoring, a right answer was given 1 and the wrong answer was given zero. The item scores were added up, and the total was divided by the number of items, yielding a mean score for the part. The total score was 30 and was classified as satisfactory (from 60% or higher) or unsatisfactory (less than 60%).

Tool (II):Self-care reported practice. It was adapted from (**Berti-Hearn & Elliott,**

2019 & Bird et al, 2019) to assess the self-care practice of the colostomy patient. Includes remove of the old pouch (5) steps, peristomal skin care (6) steps, apply new pouch (12) steps, evacuation of the pouch (7) steps, irrigation of colostomy (15) steps. The total number of steps for all categories was 45. Two points were given for each correctly done step, one point for the incompletely done step, and zero points for a step that was not done. Total level of practice score classified as follows: 60% and more was considered adequate practice and from less than 60% of the total score was considered inadequate practice.

Tool III: Stoma Self-Efficacy Scale: It was adapted from **(Bekkers et al., 1997)** used to assess the level of self-efficacy in ostomy patients. There were 22 items were rated on a 5-point Likert scale ranging from ''not at all confident'' to ''highly confident.'' Higher scores consider a higher level of stoma self-efficacy. The overall score range from 22 to 110, According to the scores obtained, patients were divided into three levels as follows: low self-efficacy (less than or equal to 55 points), moderate self-efficacy (56–82 points), and high self-efficacy (greater than or equal to 83 points).

Tool IV: Peristomal skin assessment scale: It was adapted from **Martins et al., 2015** and used to assess the extent and severity of peristomal skin complications and consists of three domains: Discoloration, Erosion, and Tissue overgrowth (DET) score. The total score is 0 to 15. Categorized as follows, unaffected (DET = zero), mild (DET = 1-3), moderate (DET = 4–6), and severe (DET = 7-15).

Content validity and reliability:

The content validity was verified by five academic staff from Faculty of Nursing, Zagazig University's. According to their opinion, modification was carried out. Reliability was checked using the test-retest method; The correlation coefficient was calculated for the tools I, II, III and IV (0.91, 0.83, 79 and 0.72), respectively, indicating high reliability of the tool.

Ethical considerations:

The Ethics Committee of Zagazig University's Faculty of Nursing reviewed and

approved the study proposal. Informed consent was taken from participants once the aim of the study was clarified, no harmful procedure was used on the participants, each participant had the right to withdraw from the study at any moment, human rights were asserted. The data would be kept private.

Pilot study:

A pilot study was performed on 10% of the study participants to evaluate the clarity, applicability and feasibility as well as to predict the time taken to complete the tools. In accordance, some modifications were made in order to have more relevant data collection tools. These patients were not included in the study.

Field Work

Data were gathered over a period of 12 months starting in January 2020 and ending in December 2020. The study was conducted in four phases: assessment, planning, implementation, and evaluation.

Assessment Phase:

Each patient who met the inclusion criteria was interviewed for an initial assessment in order to take information on pre-existing colostomy knowledge, and practice, as well as to assess self-efficacy and prostomial skin using the pre-constructed tools.

The researcher collected data three days a week in the outpatient clinic. The data were gathered during the morning shift through interviewing the patients individually. Each interview lasted between 30 and 45 minutes.

Planning Phase:

Based on the data collected during the assessment phase and the literature review, the researchers developed the objective and content of the educational program. In addition, the researcher developed a colored booklet in a simple Arabic language and illustrated posters that were distributed to each patient.

Implementing phase:

The educational program covered both the theoretical and practical aspects, which was conducting in 4 main sessions (3 theoretical and 1 practical). It was carried out in the

patient waiting place or any other empty room depending on the status of the clinic, the number of patients assigned to the educational session coordinated by the researchers, the patient in each session was 7-8 patients, the program was repeated 8 times by the researchers for 8 patient groups cover the overall number of patients. Each session lasted in 60 minutes, including discussion periods.

The theoretical part was carried out through lectures and group discussions, using posters and data presentation as a media. While the practical part was carried out through demonstrations, re-demonstration, posters, real materials, and showed a video

Sessions of edcational program included the following:

Session 1: It was an introductory session to establish of the relationship, and inform the patient about the benefit, content, and program schedule.

Session 2: It was included anatomy of the digestive system, colostomy definition, types, causes, complications, management of the colostomy problems and colostomy care (protecting the skin around the colostomy, irrigation, changing and evacuating the pouch).

Session 3: It was included dietary guidelines, bathing, clothing, swimming, exercise, activity, return to work, travel advice, sexual relationships, religious activities, social and psychological relationships.

Session 4: It was included removal of old colostomy bag, changing a colostomy appliance, stoma pouch emptying, peristomal skin care and stoma irrigation.

Each session began with rapid summary of the previous discussed session. Following the implementation of the educational program, each patient obtained a copy of the booklet.

Evaluation phase: At the end of the implementing the educational program, an evaluation was conducted to assess its effectiveness on patients' knowledge, practice pre-, immediately post and post three months using tool (I) and tool (II). Evaluating patients' self-efficacy and peristomal skin complications by comparing pre, post one and post three months using tool (III)and (IV).

Administrative Design: A formal letter from the Dean of the Faculty of Nursing, Zagazig University, to the director of the Zagazig Hospital, clarifying the aim of the study, was issued in order to obtain approval to conduct this study.

Statistical Design: The data collected were checked, coded, tabulated and statistically analyzed using the Statistical Package for Social Sciences (SPSS). Data were presented in tables and graphs with numbers, percentages, means and standard deviations. Chi-square test, and t – test was also used. Level of significance was the threshold at < 0.05.

Table 1: Shows that 43.3% of the patients in their age from 50 to 60 years old, with a mean age of 47.34 ± 8.44 years. Regarding gender, it was found that 60.0% of them were males. Concerning marital status, 63.3% of them were married. Regarding the level of education, 31.7% of them had a secondary education. In addition, this table showed that 38.3% of the studied patients were employed. On the other hand, 53.3% of them lived in urban areas. Regarding the causes of the colostomy, 65.0% of patients had colorectal cancer. Concerning smoking habits, 58.3% of them were smokers. While 3.3% had a family history of colon cancer.

Table 2: Shows that the patients' knowledge was lower on all items in pre implementing the educational program. Immediately post, there was statistical significant improvement in all items of patients' knowledge while post three months after implementation the educational program slight declines were observed, but they remained significantly higher compared to the pre-program (p < .001). Regarding overall knowledge, the total satisfactory knowledge increased from 8.3. % in the pretest to 93.3% and 90.0% immediately post and post three months, as well as mean scores pre implementing educational program were 9.38±4.28 and improved immediately post and post three months (24.10±2.26& 23.43±2.25) respectively with a statistically significant difference between them (p <0 .001)

Table 3: Shows that the patients' practice was lower in all items pre implementing the educational program. There was statistical significant improvement in all items of patients' practice immediately post and post three months after implementing the educational program (p < .001).Regarding overall practice, the total adequate practice increased from 11.7% in the pretest to 86.7% and 90.0% immediately post and post three months respectively after implementing the educational program as well as mean scores pre implementing educational program were 23.11±12.06 and improved immediately post and post three months (67.61±11.65& 69.98±12.01) respectively with a statistically significant difference between them (p <0 .001)

Table 4: Illustrated that 70.0% of studied patients had low self-efficacy level pre implementing educational program compared to (25.0% and 20.0%) respectively post one, and post three months. There were statistical significant between pre, post one, and post three months after implementing educational program at p < 0.001. the total mean scores of stoma care self – efficacy was 49.36±9.51 in pre implementing educational program increased to (72.40±17.21and73.86±18.0) post one, and post three months, with statistical significant between them at p 0.005.

Figure (1): Indicates that, 50.0% of the studied patients had moderate skin complication pre implementing educational program compared to 11.7% and 8.3% respectively post one and post 3 months after implementing educational program. There were statistical significant between pre, post one and post 3 months at p<0.001.

Table 5: Illustrated that there was positive correlation between knowledge, practice and self-efficacy in the pre and post three months after implementing educational program. Moreover, this table shows that there was negative correlation between knowledge, practices, self-efficacy and priestomal skin complication in the pre and post three months after implementing educational program.

Table (1): Distribution of demographic and clinical data of the studied patients (N=60).

Socio-demographic data	N	%
Age		
20 <30	3	5.0
30< 40	13	21.7
40< 50	18	30.0
50-60	26	43.3
Mean ±SD	47.34 ± 8.44	
Sex		
Male	36	60.0
Female	24	40.0
Marital status		
Single	12	20.0
Married	38	63.3
Divorced	3	5.0
Widow	7	11.7
Education		
Illiterate	9	15.0
Basic education	14	23.3
Secondary education	19	31.7
University	18	30.0
Occupation		
Employee	22	36.3
Free work	15	25.0
Not work	17	28.3
Retired	6	10.0
Residence		
Urban	32	53.3
Rural	28	46.7
Causes of stoma:		
Colorectal cancer	39	65.0
Diverticulitis	11	18.3
Inflammatory bowel disease	7	11.7
Bowel obstruction	3	5.0
Smoking		
Smokers	35	58.3
Non-smokers	25	41.7
Family history of colon cancer:		
Yes	2	3.3
No	58	96.7

Table 2: Knowledge related to colostomy care among studied patients pre, immediately post and post three months after implementing of the educational program (N=60).

	Pre		post		Follow-up		χ^2 (P) Pre-post	χ^2 (P) Pre-FU
	No	%	No	%	No	%		
Satisfactory knowledge (60%+) about:								
- Definition & Causes of colostomy	12	20.0	52	86.7	50	83.3	53.57(<0.001) *	48.18(<0.001) *
- Health characteristic of colostomy	6	10.0	51	85.0	48	80.0	67.66(<0.001) *	59.39(<0.001) *
- Complication and prevention	0	0.0	57	95.0	55	91.7	108.57(<0.001) *	101.53(<0.001) *
- Dietery change	9	15.0	60	100.0	60	100.0	88.99(<0.001) *	88.99(<0.001) *
- Daily activity	2	3.3	57	95.0	56	93.3	100.86(<0.001) *	97.30(<0.001) *
- Colostomy care	2	3.3	53	88.3	51	85.0	87.30(<0.001) *	81.13(<0.001) *
- Follow-up	15	25.0	58	96.7	56	93.3	64.66(<0.001)*	57.95(<0.001) *
Total knowledge score								
Satisfactory	5	8.3	56	93.3	54	90.0	86.72 (<0.001) *	80.05 (<0.001)*
Unsatisfactory	55	91.7	4	6.7	6	10.0		
Mean±SD	9.38±4.28		24.10±2.26		23.43±2.25		H=124.48	<0.001*

(*) Statistically significant at p < .05; (H) Kruskal Wallis test

Table 3: Practice related to colostomy care among studied patients pre, immediately post and post three months after implementing of the educational program (N=60).

|	Pre		post		Follow up		χ^2 (P) Pre-post	χ^2 (P) Pre-FU
	No	%	No	%	No	%		
Adquate practice (60%+) about:								
- Removing old pouch	6	10.0	55	91.7	56	93.3	68.49(<0.001) *	68.49(<0.001) *
- Peristomal skin care	6	10.0	51	85.0	51	85.0	56.17(<0.001) *	50.61(<0.001) *
- Appling new pouch	14	23.3	52	86.7	53	88.3	56.17(<0.001) *	62.22 (<0.001) *
- Evacuation of pouch	18	30.0	60	100.0	60	100.0	72.38(<0.001) *	72.38 (<0.001) *
- Irrigation of colostomy	2	3.3	47	78.3	48	80.0	62.22(<0.001) *	53.33(<0.001) *
Total practice score								
Adquate	7	11.7	52	86.7	54	90.0	59.13(<0.001) *	56.17(<0.001) *
Inadquate	53	88.3	8	13.3	6	10.0		
Mean±SD	23.11±12.06		67.61±11.65		69.98±12.01		H=113.88	<0.001*

(*) Statistically significant at p < .05; (H) Kruskal Wallis test

Table 4: Stoma care self – efficacy level among studied patients pre, post one and post three months after implementing the educational program (N=60).

Self-efficacy Scale	Pre		post		Follow up		χ^2 (P) Pre-post	χ^2 (P) Pre-FU
	No	%	No	%	No	%		
Low self-efficacy (≤ 55)	42	0.0	15	25.0	2	20.0	37.89 (<0.001) *	46.66(<0.001) *
Moderate self-efficacy (56–82)	18	30.0	20	33.3	8	30.0		
High self-efficacy (≥ 83)	0	0.0	25	41.7	0	50.0		
Mean±SD	49.36±9.51		72.40±17.21		73.86±18.01		H=68.22	< 0.001*

(*) Statistically significant at p < .05; (H) Kruskal Wallis test

Figure (1): Peristomal skin complication severity among studied patients pre, post one and post three months implementing of the educational program (N=60).
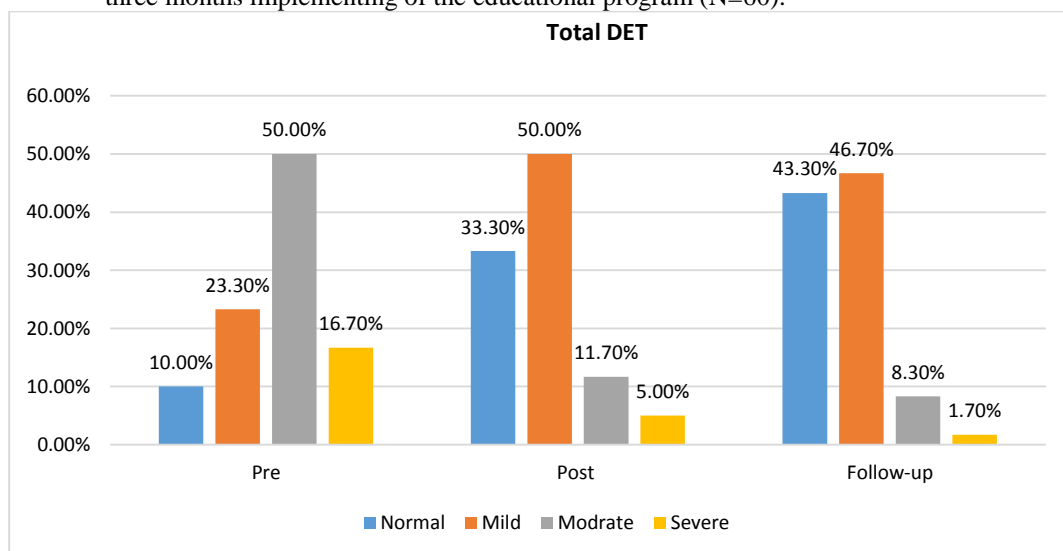
Table 5: Correlation between total knowledge, total practices, total self-efficacy and priestomal skin complication pre, and post three months after implementing the educational program (N= 60)

Variables	Pre				Follow-up			
	Knowledge	Practice	Self-efficacy	Complication	Knowledge	Practice	Self-efficacy	Complication
Knowledge	-	.553**	.390*	-.383*	-	.363*	.404**	-.723**
Practice	.553**	-	.538**	-.613**	.363*	-	.418**	-.539**
Self-efficacy	.390*	.538**	-	-.458**	.404**	.418**	-	-.741**
Complications	-.383*	-.613**	-.458**	-	-.625**	-.539**	-.741**	-

Discussion

Patients with colostomies encounter significant challenges in getting the knowledge they need to adjust to their new circumstances. Education plays an important role in developing an individuals' self-care, independence and adaptation to the disease. Moreover, patients want to know what life will be like immediately following ostomy surgery. Nurses are crucial in informing patients about the process of adjusting to living with stomas (**Lim, Chan, and He.,2015).** Thus, the present study was conducted to evaluate the effect of the educational program on self-efficacy and peristomal complications for patients with permanent colostomy.

Regarding demographic and clinical data, the current revealed that nearly half of the studied patients, their age from 50 to 60 years old, with a mean age of 46.24 ± 8.28 years. This result is consistent with **Mohey El Din, Hasan, Abdel Hameed& Abdel Aziz., (2018)** who found that two thirds of the sample were over 50 years old. Furthermore, this finding agrees with the results of **Nieves et al., (2017),** who found that the most colostomies were performed in adults over 50 years. This may be because people over the age of 40 are more likely to develop colon cancer.

In terms of gender, the present study found that more than half of the studied patients were men. This result was consistent with a study by **Qalawa and Moussa., (2019)** which confirmed that the vast most of the colostomy patients were male. And in the same line with **Abdelmohsen., (2020)** were found that the highest percentage of ostomy patients were men. This may be due to the fact that most men are heavy smokers and more likely to consume a high processed and red meat, which associated with greater colorectal cancer risk.

Regarding marital status, about two third of patients married. This is consistent with the findings of **Abdulmutalib, Nagshabandi, &Alansari., (2018) & Irshad, et al., (2021)** who found that the most colostomy patients were married. This could be because of the colostomy procedure would raise the needs and burden the patients due to numerous duties to their children and spouses, implying that the condition would influence their family.

In terms of educational level; the result of the showed that more than a third of the patients had secondary education. This result could be attributed to the fact that most of the patients live in an urban area and pay attention to education. This result is consistent with **Ran et al., (2016)** who found that most of the patients' study had a secondary education had a secondary education. This result was also in conflict with **El sayed, Abd Elhameed &Hassanen (2018),** whose study looked at the "effect of nursing ostomy care training on geriatric patients' self-esteem and psychological status; and discovered that around half of the studied patients were uneducated.

Regarding patients' occupation, the result of this study showed that one third of the sample was employed. This finding was consistent with **Abd el Rahman et al., (2020)** whose study looked at the "effect of nursing instructions on self-care for colostomy patients, and who found that more than half of the patients were working.

Regarding the place of residence of the patients, the current study found that more than half of the patients studied came from an urban area. This is consistent with **Elhoty., (2017),**

who found that more than half of the studied sample came from urban region, and also contradicts with **Mohamed, (2018),** who discovered that the majority of the sample resided in urban areas. This is may be due to increase the risk factors for cancer in urban areas as pollution and bad habits as in activity and fast food.

In relation to the causes of colostomy, the current study discovered that more than half of the patients studied had colorectal cancer. This agreement with **Abd el Rahman, Mekkawy, Sayed, & Ayoub., (2020)** who revealed that half of the sample had an ostomy due to colon cancer. Also, according to the result of study by Abdulmutalib**, Nagshabandi, &Alansari., (2018)** who reported that colorectal cancer is the cause of more than half of stoma surgeries.

In relation to smoking, the current study finding found that almost half of the sample were smokers. This result in the same line with **Miller et al., (2016)** who discovered that, half of their subjects were smokers. The researchers' opinion that smoking is one of factors contributing to colon cancer.

Most colon cancers occur in people with no a family history of colon cancer. In some cases, the reasons for the increased risk are unclear. Cancer can "run in families" due to genetic factors, environmental factors, or a combination of these **(American Cancer Society 2020).** In the same context, the result of the present study reported that, majority of studied participants had no family history of colon cancer. On the contrary **Heald et al., (2020)** stated that**,** up to one third of patients with colon cancer had a positive family history, this putting one of the greatest significant and manageable risk factors.

Concerning the patients' colostomy knowledge pre, post, and post three months after implementing the educational program. The current study showed that the majority of study participants had a satisfactory level of knowledge in the post and post three months after compared to pre implementing the educational program. The current study's findings revealed a highly significant improvement in knowledge immediately post and post three months after implementing the

educational program compared to the pre-program.

The findings of this study are consistent with those of **Sabea &Shaqueer., (2021)** who reported that the patients had some but not extensive knowledge about stoma care; with the lowest scores in colostomy irrigation, stoma associated problems, and how to manage it. Furthermore, **Seo., (2019)** discovered that the study group's stoma knowledge scores were significantly higher than the control group's scores. This also goes with the study by **Qalawa & Moussa., (2019)** who found that colostomy patients' knowledge was significantly increased after the education compared to before education.

Concerning the patients' practice about colostomy pre, immediately post, and post three months after implementing the educational program. The results of the present study showed that all study participants had an inadequate practice level in preprogram ,while the most of them in immediately post and, three months later had an adequate practice level. Also, the results of current study discovered that a highly significant improvement in the of practice immediately post and post three months after implementing the educational program when compared to the pre- program.

This finding is consistent with the findings of **Nygren et al. (2019),** who found that total scores for colostomy care practice improved after the implementation of the program, with a significant difference. However, **Almanzalawi., (2020)** found a highly significant improvement of patient practice in the post education guidelines as likened to the pre-assessment.

The researchers attribute the educational program had positive effect on the colostomy patients. This provided the knowledge and emphasized that education can improve the stoma care patients' knowledge and practice in order to help them with this care option.

Regarding of stoma care self-efficacy pre, post one and post three months after implementing the educational program. The current study found a statistically significant difference between pre and post one and post

three months after the educational program was implemented. Also, there was a significant improvement in the overall mean score self-efficacy level after implementing the educational program. This is due to the positive outcomes of the educational program.

The result of this study was supported by **Xie et al., (2020)** who found that self-efficacy can be enhanced and influenced by the health literacy, ultimately affecting a patient's quality of life. **Mohamed, Salem. & Mohamed., (2017)** who showed that the stoma self-efficacy mean score was lower in the pre-program period as matched to the post-program period, there were also more improvements during the period of follow-up with a statistically significant differences.

In relation to severity of peristomal skin complications, the current study revealed that half of the studied subjects had moderate peristomal skin complications preprogram while this complication was reduced post one and three months later. In researchers experience these results because of increased self -care ability to in detecting and dealing with abnormalities. In the same line with **Safwat, Mosbeh & Mohamed., (2018)** who found that the peristomal skin condition total scores decreased after and in follow-up after the application of the guideline.

Regarding the correlation between patients' overall knowledge, practice, and self-efficacy, pre and post three months of implementing educational program there were significant positive correlations between patients' total knowledge, practice, and self-efficacy scores. The researcher opinion that patients with better knowledge of colostomy care and the ability to handle all measures of care independent were better stoma adjusted than patient who were less knowledge and had a greater need of care from others. The result of this study is consistent with **Qalawa & Moussa., (2019)** who clarified that there is a statistically significant link between patients' knowledge scores and practice among colostomy patients in post educational application. This result was also in agreement with **Almanzalawi., (2020)** who found a highly statistically significant positive association between the studied patients' knowledge and

practice about ostomy care between the pre- and post- program.

This is supported by the results of **Culha, Kosgeroglu and Bolluk., (2016)** who confirmed that patient self-care scores in the study group increased as knowledge of stoma increased as well, indicating that, and sufficient knowledge of the condition enabled self-care.

The results of the current study showed that there was a statistically significant negative correlation between the patients' overall knowledge scores, practice, self-efficacy and peristomal skin complication pre and post three months after implementing educational program. This might be because the improving level of knowledge and positively affects the patients' level of practice, therefore being able to decrease the occurrence of peristomal skin complications. This finding was consistent with **(Mahdy et al. 2018),** which found that the study group there were negative significant association between the overall scores of patients' ostomy complications and patients' knowledge, practice and self-efficacy in compared with the control group.

Conclusion

The educational program improved the knowledge, practices, and self-efficacy, moreover reduce the severity of the peristomal skin complication in colostomy patients.

Recommendation:

- Colostomy patients should receive a planned educational program before their discharge.

- Education program must be carried out regularly for these patients, involving the family and care provider during the educational session to take part in the care of the colostomy patient.

- Further studies on a large sample of colostomy patients should be conducted to confirm the results and generalizability.

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