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Effect of a Nursing rehabilitation Program Knowledge and Self-care practice of patients undergoing urinary diversion

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Abstract:
Background: Urinary diversion through the ileal conduit is a common surgery. Assessing patients' knowledge and deficiencies in self-care practices might help meet their demands and enhance their outcome. **Aim:** Evaluating the effective of the nursing rehabilitation program on knowledge and self-care practice in Ileal conduit diversion patients. **Method**: A quasi-experimental study (pre–post test) design was utilized to fulfill the aim of the study. **Setting**: The study was carried out in the oncology surgery department& out-patients clinic at South Egypt Cancer Institute; on a purposive sample of 30 male and female adult patients undergoing ileal conduit urinary diversion. **Two tools** were utilized; **(I):** Patient structured interviewing questionnaire. **(II):** knowledge and self-care practice assessment. **Results:** The majority of ileal conduit patients were males, aged between 50 to less than 65 years, married, non-educated, and most worked in farming and from rural areas. Half (50%) of the patients had bladder cancer, while 40% suffered from hypertension. More than half (56.7%) had a right-side stoma, and 53.3% underwent radiotherapy. There was a statistically significant difference between immediately post, before discharge and after one month regarding total patient knowledge and stoma self-care practice (P. =0.000). **Conclusion:** Improvement of total knowledge and self- care practices in patients undergoing ileal conduit urinary diversion after application of the rehabilitation program. **Recommendations:** Further research is needed to explore the long-term effects and to identify the most effective educational strategies for improving nurses' knowledge, skills, and attitudes in this area.

Keywords: Ileal Conduit Urinary Diversion, Nursing Rehabilitation Program & Self-care practice

Introduction:
The incidence of bladder cancer, which often leads to the need for ileal conduit urinary diversion, has been steadily increasing worldwide. According to recent data, bladder cancer ranks as the 9th most common cancer globally, with an estimated 573,000 new cases and 200,000 deaths annually. Additionally, the prevalence of bladder cancer is higher in older adults, particularly males, with a lifetime risk of about 1 in 26 for men and 1 in 86 for women. This increase in incidence highlights the importance of effective management strategies for patients undergoing ileal conduit surgery, as these patients often face significant challenges with self-care and stoma management, making nursing interventions crucial for improving their quality of life and post-operative outcomes **(Dunne et al., 2021).**

Nursing rehabilitation programs play a crucial role in enhancing the overall well-being for patients undergoing various medical procedures. One such procedure is the creation of an ileal conduit urinary diversion, commonly known as a uro-stoma **(Burch et al., 2023).**

This surgical intervention involves rerouting the urinary system, requiring patients to adapt to a new way of managing their urinary function. The impact of this procedure on patients' self-efficacy can be significant, as they may face challenges in adjusting to the physical and emotional changes associated with uro-stoma care **(Panattoni et al., 2023).**

Nursing rehabilitation programs for patients undergoing ileal conduit urinary diversion typically involve a multidisciplinary approach. The healthcare team, including nurses, enterostomal therapists, and mental health professionals, collaborates to develop individualized care plans. These programs focus on educating patients about uro-stoma care, such as stoma hygiene, appliance management, and dietary considerations. By imparting knowledge and teaching practical skills, nursing rehabilitation programs empower patients to become active participants in their own care, thereby improving their uro-stoma self-efficacy **(Perez, 2019) & (Roveron et al., 2021).**

Psychological factors play a significant role in the overall adjustment and self-efficacy of patients with a uro-stoma. Nursing rehabilitation programs emphasize the importance of addressing the emotional and psychological impact of this life-altering procedure. Mental health professionals are often involved in these programs to provide

counseling and support to patients, helping them cope with body image concerns, anxiety, and depression related to the presence of a uro-stoma. By addressing these psychological aspects, nursing rehabilitation programs contribute to the overall well-being of patients and enhance their self-efficacy in managing their uro-stoma **(Dunne et al., 2021).**

The effectiveness of nursing rehabilitation programs in improving uro-stoma self-efficacy has been supported by research studies. These programs have shown positive outcomes in terms of enhancing patients' knowledge and skills related to uro-stoma care. They have also demonstrated improvements in patients' confidence, self-esteem, and ability to perform daily activities without undue reliance on healthcare professionals. The tailored interventions provided through these programs have been found to be particularly beneficial in promoting patient independence and self-efficacy **(Zhang & Qi, 2023).**

Nursing rehabilitation programs have a significant impact on uro-stoma self-efficacy for patients undergoing ileal conduit urinary diversion. By providing education, guidance, and support, these programs empower patients to regain their self-confidence and independence in managing their uro-stoma. The multidisciplinary approach, including nursing care, enterostomal therapy, and mental health support, addresses the physical, practical, and psychological aspects of uro-stoma care. Further research and the development of standardized protocols for nursing rehabilitation programs can contribute to better outcomes and improved quality of life for individuals with a uro-stoma **(Burch, 2022).**

Significance of the study:

Based on clinical experience, the researcher has shown that patients undergoing ileal conduit urine diversion have inadequate awareness of urostomy self-care, which leads to numerous problems and readmissions. Thus, the purpose of this study was to help patients take charge of their urostomy care and emphasize the value of knowledge and education in improving patients' self-care practice. Also Ileal conduit urinary diversion facing many difficulties both physical and psychological that impact on their reported practices. the rehabilitation programs are critical part in the urinary diversion patients transition from initial shock to acceptance **(Wu et al., 2021).**

Also, competent rehabilitation program provide urostomy care and education and needed skills that focuses on full rehabilitation **(Nelson et al., 2019).** This study will provide patients undergoing ileal conduit urinary diversion with knowledge and skills which could have a direct influence on improving their self-reported practices.

Operational definition of nursing rehabilitation program:

Is the patient preparation strategies before surgery, and include pre & post-operative measures to improve functional capacity and enhance post-operative recovery **(Nelson et al., 2019) & (West et al., 2022**).

Aim of the study:

To evaluate the effect of nursing rehabilitation program on knowledge and self-care practice of patients undergoing Ileal conduit urinary diversion

Research hypothesis:

Patients' knowledge and self- care practices regarding urostomy care will improve after receiving the nursing rehabilitation program.

Methods

Research design:

Quasi experimental (pre / post) research design was used in this study.

Settings :

The study was conducted at oncology surgery department& out-patients clinic at South Egypt Cancer Institute

Study Sample :

A purposive sample of 30 male and female adult patients undergoing ileal conduit urinary diversion , their age ranged from (20 to 65 years), willing to participate in the study and submit the following criteria with no history of mental illness and cognitive impairment (dementia).

Sample size:

The sample was selected by using the following equation according to **Steven, (2012)**

$$n = \frac{N \times p(1-p)}{[[N-1 \times (d^2 \div z^2)] + p(1-p)]}$$

N=total patient population size 50 who undergoing ileal conduit urinary diversion in South Egypt cancer Institution, Assiut University hospitals. This collected during the year 2020-2022.

z = confidence levels are 0.95 and are equal to 1.96

d= The error ratio is = 0.05

P= The property availability ratio and neutral = 0.50

N =30

Tools:

Tool (I): Patient Structured Interviewing Questionnaire:

It was developed by the researcher based on current national and international literatures. to assess patient's demographic and medical data, it included two parts:

Part (I): Patient's demographic data assessment: as (age, gender, occupation, marital status, residence and level of education).

The aim of this tool is to assess patients demographic and medical data.

Part (II): Medical data assessment:
It included questions as (presence of chronic diseases, past& present health history).

Tool (II): Knowledge & self-care practice assessment for patients undergoing Ileal conduit urinary diversion:
This tool was developed by the researcher after reviewing the relevant literature **(Rangarajan, & Somani, 2019), (McAlpine et al., 2019) & Merandy et al., 2021).**
It was used to assess the knowledge and self-care practice of the studied patient undergoing Ileal conduit urinary diversion and included the following parts:

Part (A): pre - post Knowledge assessment for patients undergoing Ileal conduit urinary diversion:
This part aimed to assess the patients' knowledge level about ileal conduit urinary diversion.
It included items as (definition, explanation of the operation, risks, unusual signs, complications of the urostomy, preparation of the surgery, postoperative self-care and discharge instructions about diet, urostomy care.

Scoring system:
It included 15 items and the total score was 30. If the question is answered correctly, it scored 2, while if the question isn't answered correctly it scored zero.
The total score was 30 grades.
It was considered that: ≥ 60 % is satisfactory, while < 60 % is unsatisfactory.

Part (B): Patient's urinary stoma self-care Practice observational checklist:
It was developed by the researcher based on the related literature it aims to assess permanent urostomy patients' ability to perform skills related to urinary stoma self-care practices as stoma observation and stoma care, emptying and changing pouching system. It perform pre, immediately post , post one month and post six months after application of the program.

It included 3 parts:
First: Observing and cleaning the skin around urinary stoma including: perform hand hygiene, gathered supplies , sit in a comfortable position. Assess stoma and peristomal skin.
Second: It included perform steps of evacuating the pouch from the urine including apply gloves. remove ostomy bag &empty contents. Place old ostomy bag in garbage bag. Remove flange by gently pulling it toward the stoma. Support the skin with your other hand. And remove a adhesive tape. Clean stoma gently by wiping with warm water. Assess stoma and peristomal skin .
Third: Remove inner backing on flange and apply flange over stoma Apply pressure ,attach the clip to the bottom of the bag. Hold palm of hand over ostomy bag for 2 minutes to assist with appliance adhering to skin. Remove outer border backing and press gently to create seal. Leave the border tape on, and measure the stoma diameter using the measuring guide and cut out stoma hole , and apply the ostomy bag .

Scoring system:
If the step is done correctly, it scored 1, while if the step isn't done or done incorrectly it scored zero.
The total score was 22 grades.
It considered that: ≥ 60 % (≥ 13 grades) is adequate, while< 60 % (< 13 grades) is inadequate.
Test reliability of the tools was confirmed by Cronbach's alpha (0.97) for tool II.

Nursing rehabilitation program:
It was designed based on urinary diversion patients' needs and level of understanding. It was written in simplified illustrations Arabic language in the form of booklet. The content included all theoretical and practical parts regarding care of patient undergoing ileal conduit urinary diversion.

Theoretical part:
Explanation of the surgery, purpose of stoma, risks, and complications from it.

Preoperative preparation:
Day before and the day of surgery.
Postoperative care and instructions related foods causing bad odor or gases, odor control, traveling preparations, discharge instructions; follow – up visits and unusual signs, or manifestation).

Practical part:
Before this session must be feedback about previous session and answer about any questions for patient. Teach patient how to observe the skin around stoma and how assess signs and symptom of infection, teach the patents how to perform emptying and changing pouching system. Every patient must be demonstrating steps of emptying and changing pouching system. This session taking 20 to 30 hour and carried out in the patients' rooms. patients' ability to perform skills related to urinary stoma self-care practices as stoma observation and stoma care, emptying and changing pouching system. It included 3 urinary stoma self-care practices.
Each patient had a print copy (colored copy) in Arabic language.

Validity:
Once the tools of data collection were prepared ,their face validity and content validity were judged by a panel of five experts professors of Medical Surgical Nursing staff and surgical oncology staff who reviewed the tools for clarity, relevance and applicability, comprehensiveness and ease of implementation. In the light of their assessments, minor modifications were applied. Test reliability of

the tools was confirmed by Cronbach's alpha (0.97) for tool II.

Permission for voluntary participation was obtained from patients and the nature and purpose of the study was explained.

Reliability of the study tool:

The reliability of the test was calculated by using correlation coefficient and it was estimated by Alpha Cronbach's test for this study.

Pilot study:

Pilot study was conducted on 10% of the study sample (3) patients with urinary diversion in order to test feasibility, clarity and applicability of the tools then necessary modifications was carried out.

Ethical consideration:

Research proposal was approved from ethical committee of nursing faculty the ethical code (1120240495) at 27/11/2022 .There was no risk for study subjects during application of the research. The study was followed common ethical principles in clinical research. Oral consent was obtained from patients participated in the study, after explaining the nature and purpose of the study. Confidentiality and anonymity were assured. Study subject had the right to refuse to participate or withdraw from the study without any rational at any time. Study subject privacy was considered during collection of data

Method:

- An approval from Ethical Committee in the Faculty of Nursing was obtained.
- An official permission to conduct this study was obtained from the head of oncology surgery department, out-patient clinic at South Egypt Cancer Institute.
- Reviewing of the current available literature using books, articles and scientific journals to develop tools for data collection **(Sun et al., 2018 & Wang et al., 2018).**
- Patients who met the criteria for possible inclusion were approached by the researcher.
- Patient's agreement for voluntary participation was obtained after explanation of the purpose and nature of the study.
- Data was assured confidentiality and anonymity and will be collected using the study tool mentioned.
- At the initial interview, the researcher greeted the patients, introduced herself and purpose of study was explained to patients who agreed to participate in the study prior to any data collection.
- Each patient who took part in the research was interviewed too much individually to obtain data that were established using an The patients' demographic and medical data (pre) was assessed on patient admission (tool I) and the researcher gathered the data. Every session took about 10-15 min.

Assessment of knowledge and self-care practice was done twice as follows: using tool (II).

One at beginning of study was considered as pre-test assessment and as base line data for latter comparison with future post-test.

The nursing instructions were administered in 2 session

The first session:

knowledge about the surgery, purpose of stoma, risks, and complications from it.

knowledge about **preoperative preparation;** day before and the day of surgery.

Postoperative care and instructions related foods causing bad odor or gases, odor control, traveling preparations, discharge instructions; follow – up visits and unusual signs, or manifestation).

Second session: Practical part:

Second session: before this session must be feedback about previous session and answer about any questions for patient. Teach patient how to observe the skin around stoma and how assess signs and symptom of infection, teach the patents how to perform emptying and changing pouching system. Every patient must be demonstrating steps of emptying and changing pouching system. This session taking 20 to 30 hour and carried out in the patients' rooms

Statistically analysis

The SPSS version 23 statistical software application was used to evaluate, code, analyze, and tabulate data. Frequencies and percentages were used as descriptive data. To analyze the association between two or more qualitative variables, the Chi square (χ^2) test was utilized. Qualitative data were reported as numbers and percentages (n, %). Correlation coefficients are used to assess the strength and direction of the linear relationships between pairs of variables. P-value $\leq$ 0.05 was established as the significant level.

Result:

Table (1): Frequency& percentage distributions of studied patients as regarding to their demographic parameters (n= 30).

Variables	n.	%
Age		
30:<40	4	13.3
40:<50	4	13.3
50:<65	22	73.3
Sex		
Male	22	73.3
Female	8	26.7
Marital status		
Married	30	100.0
Residence		
Urban	11	36.7
Rural	19	63.3
Educational level		
High education	4	13.3
Read and write	8	26.7
Secondary school	8	26.7
Non educated	10	33.3
Occupation		
Professional work	5	16.7
Manual work	14	46.7
Not working	11	36.7

Table(2): Frequency& percentage distributions of studied patients as regarding to their medical data (n= 30).

Variables	n.	%
Presence of chronic diseases(past & present health history)		
Hypertension	12	40.0
Diabetes mellitus	10	33.3
Pulmonary disease	1	3.3
Cardio vascular disease	7	23.3
Kidney stone	11	36.7
Prostatic problem	9	30.0
Urinary tract infection	4	13.3
Chronic kidney disease	6	20.0
Cancer bladder	15	50.0
Prostatic cancer	9	30.0
Plavic malignancy	6	36.7
Stoma site		
Right	17	56.7
Lift	7	23.3
Combination	6	20.0
Treatment		
Chemotherapy	7	23.3
Radiotherapy	16	53.3
Combination	8	26.7

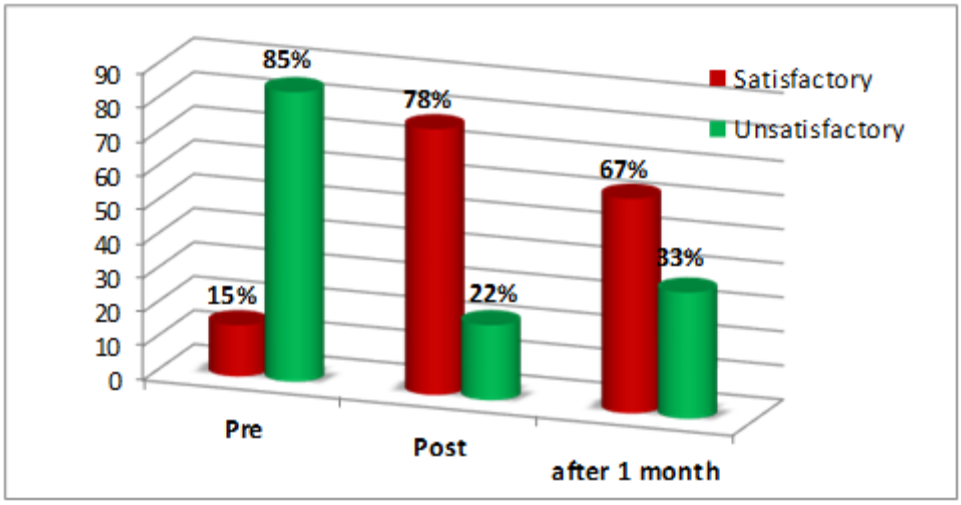

Figure (1):Comparison between immediately post, before discharge and after one month regarding total knowledge level for patient participants (n=30)

Table (3): Comparison between immediately post, before discharge and after one month regarding total stoma self-care practice score among urostomy patients n=30

Variables		Pre	Post	After one month	P.value
Unsatisfied ≤60	N	23	8	6	75.252 .000
	%	76.6%	20%	26%	
Satisfied≥60	N	7	22	24	
	%	23.4%	80%	73.7%	

Table (4): Correlation between total knowledge and practice total level for the studied patient (n=30)

		Knowledge	Practice
Knowledge	**Pearson Correlation**		0.668**
	Sig. (2-tailed)		0.000
Practice	**Pearson Correlation**	0.668**	
	Sig. (2-tailed)	0.000	

****. Correlation is significant at the 0.01 level (2-tailed).**

Table (1): Shows that study the highest percentage of the studied ileal conduit patients were males (73.3%) and old adult in the age group between 50 to less than 65 years , all of them (100%) were married, (33.3%) non educated, their work varied between farming and manual work (46.7 and 36.7%), and came from rural area (63.3%).

Table (2): Shows that half (50%) of Ileal conduit urinary diversion had Cancer bladder, and two fifths (40%) suffered from hypertension, more than half **(56.7%)** had right side stoma and had a radiotherapy (53.3%).

Figure (1): Shows that; there was a statistically significant difference between pre, post program and after one month regarding total knowledge level for patient participants (n=30) (P. =0.000). In pre program

Table (3): Shows that there was a statistically significant difference between immediately preprogram, post and after one month regarding total patient regarding stoma self-care practice (P. =0.000). also revealed a great improvement of the total stoma self-care practice score after one month.

Table (4): Shows that there was a positive correlation was found between the ileal conduit patients' level of their knowledge and self-care practice.

Discussion

Ileal conduit urinary diversion patients have low self-care practices, and a lack of attention and support from family/ friends. So, obtaining the required information and skills for making decisions and addressing disease-related difficulties is crucial and rewarding for patients. Learning needs evaluation can aid in meeting those needs and have an impact on the patients' lifestyle. For this purpose, all factors should be explored, and learning content should be

created based on the patients' abilities and learning needs**. (Parizad et al., 2019).**

This study aimed to evaluate the effect of nursing rehabilitation program on self-efficacy for patients undergoing ileal conduit urinary diversion.

Regarding demographic characteristics, according to the findings of this study the highest percentage of the studied ileal conduit patients were males and old adult in the age group between 50 to less than 65 years, married, non-educated, their work varied between farming and manual work, and came from rural area. These characteristics were related to each other as it is considered predisposing factors to bladder cancer.

This point of view is supported by the **American cancer society, (2019)** that pointed to a range of socio-demographic characteristics as risk factors that make a person more likely to develop bladder cancer. Furthermore, **Saginala et al., (2020)** confirmed that factors that increased the risk of bladder cancer include gender, age, and environmental and occupational exposure. **Fernández et al. (2019)** added that communities with a low education level, low income families and retain jobs with a higher susceptibility to carcinogens were found to have a higher risk of developing bladder cancer.

Likewise, the finding of the study conducted at Alexandria University by **Omar et al., (2019)** and the result of **Mohamed & Fashafsheh (2019)** at National Cancer Institute- Egypt revealed that most of the clients were falling in the age group 50- 60 years old, males, married, illiterate and most patients were housewives and manual workers and come from rural area. Along the same line the study conducted by **Mansour (2019) & Mahdy et al., (2018)** found that the age of the study participant ranged between 40-60 years old and the majority of them were males, illiterate or just read and write, married, work as farmers and come from rural area. Furthermore, this may be considered similar to the result of **Heyes & Bond (2020)** who found that the majority of participants were male, married, retired and their modal category for education was secondary schooling.

Regarding medical data of the studied patients:

The present study found that half of Ileal conduit urinary diversion had Cancer bladder, and two fifths suffered from hypertension, more than half had right side stoma and had a radiotherapy. The researcher opinion that Ileal conduit urinary diversion is a surgical procedure often used to redirect urine flow after the removal of the bladder due to conditions such as bladder cancer.

This result match with **(Yang et al., 2020)** who shown that long-term surveillance is necessary for patients who undergo ileal conduit urinary diversion, as they may face an increased risk of developing cancer in the remnant urothelium or urethra over time and recommended for regular follow-ups and monitoring are essential to detect any signs of cancer recurrence.

Another study of **Feng et al., (2021)** found that while there is an increased risk of developing cancer in the remnant urothelium or urethra after ileal conduit urinary diversion, the risk is relatively low and comparable to other forms of urinary diversions. **Suriyawongkul et al., (2021)** suggest that with appropriate surveillance and regular follow-ups, the risk of cancer recurrence can be effectively managed.

While**, Omar et al., (2019)** mentioned that hypertension is not typically associated directly with ileal conduit urinary diversion, some studies have reported an increased incidence of hypertension in patients with urinary diversions. However, **Khalilullah et al., (2021)** reported that the exact cause of this association is unclear, and further research is needed to establish a definitive link.

In this regard, **Chevarria et al., (2023)** have failed to establish a significant association between ileal conduit urinary diversion and hypertension. They suggest that hypertension in these patients may be attributed to other factors such as pre-existing conditions, lifestyle factors, or unrelated medical issues. It is important to consider individual patient characteristics and confounding factors when assessing the incidence of hypertension.

The placement of the stoma (an opening created on the abdominal wall to allow urine to pass out of the body) can vary depending on the surgeon's preference and the patient's anatomy **(Matsunaga et al.,2021).** There is no universally recommended side for stoma placement **(Li et al., 2019).** While, **Volz et al., (2021)** have reported a higher prevalence of right-sided stomas, there is no consensus regarding the impact of stoma side on outcomes or complications. **Yang et al., (2020)** have reported no significant difference in outcomes or complications based on the side of stoma placement (right or left). In this side, **Galansky et al., (2021)** reported that the choice of stoma side is often determined by the surgeon's preference, patient anatomy, and other factors such as scars from previous surgeries. Also, **Igel et al., (2021)** mentioned that both right and left side stomas have shown comparable results in terms of functionality and quality of life.

A study of **Blum & Brandes, (2022)** reported that radiotherapy is a common treatment for bladder cancer, and it can be used both before and after ileal conduit urinary diversion. While, **Hoeh et al., (2021)** revealed that radiotherapy can effectively target cancer cells, it may also cause damage to surrounding healthy tissues. Studies have shown that radiation

therapy can lead to various complications, including stenosis (narrowing) of the conduit, fistula formation, and other long-term issues. However, **Scarberry et al., (2020)** concluded that the decision to use radiotherapy depends on the specific characteristics of the cancer and the individual patient's circumstances.

While radiotherapy can have complications, including those mentioned earlier, **Galansky et al., (2021)** study have shown that it can be safely combined with ileal conduit urinary diversion without significantly increasing the risk of complications. So, regarding the researcher point of view, proper planning, delivery techniques, and close monitoring can help minimize the adverse effects of radiotherapy on the conduit and surrounding tissues.

Regarding patients' knowledge, the finding of the present study reported that there were a high learning needs among studied ileal conduit patients reflected in the total mean score of knowledge. From the researchers' point of view, this may be due to lack of provided knowledge given to this group of patients. Also, highest percentage of patient had low level of education. These had a great effect on their total level of knowledge which improved after application of the nursing rehabilitation program. This is congruent with the results of **Fouad & Belal (2019)** who found unsatisfactory knowledge about urinary diversion and stoma care among the studied urinary diversion patients pre application of an educational intervention. In the same line **Zhou et al., (2019)** reported a decreased total mean score of knowledge among their studied urinary diversion patients before application of their educational programs.

By looking to ileal conduit patient self-care, the current study showed a high learning need among studied ileal conduit patients related to stoma care which reflected in the total mean score of self-care. This result supported by **Giordano et al., (2020)** how found a decreased total self-care mean score for their studied urinary diversion patients which mean high learning needs regarding self-care practice.

Regarding the Patient self-care practice:

The finding of the present study reported that there were inadequate practice level among studied ileal conduit patients reflected in the total mean score of practice level. From the researchers' point of view, this may be due to lack of provided any instruction of self-care given to this group of patients.

The rate of ileal conduit ostomy self-care mistakes in technique made by patients is very high so correct technique is required to ensure appropriate self-care. There was incorrect ostomy care in clinical practices, including empty the contents into the toilet after the return, remove the irrigation sleeve, snap on colostomy pouch flush the toilet and clean hands, clean equipment, and use the paper towel or washcloth to wash the equipment with mild soap and lukewarm water.

This is congruent with the results of **Saginala et al., (2020)** who found inadequate level of awareness about urinary diversion and stoma care among the studied urinary diversion patients pre application of an educational intervention. In the same line, **Galansky et al., (2021)** reported a decreased total mean score of knowledge among their studied urinary diversion patients before application of their nursing rehabilitation program which enhanced posttest.

This result not supported by **Seo, (2019),** how found a decreased total self-care mean score for their studied urinary diversion patients after the rehabilitation program which mean high learning needs regarding self-care practice.

Conclusion:

Patients' knowledge level and self- care practices regarding urostomy care was improved after receiving the nursing rehabilitation program. Furthermore a positive correlation was found between the ileal conduit patients' level of their knowledge and self-care practice.

Recommendations:

Further research is needed to explore the long-term effects of educational interventions and their impact on patient outcomes, and to identify the most effective educational strategies for improving nurses' knowledge, skills, and attitudes in this area.

Further study with replication of the current study on a larger probability sample is recommended to achieve generalization of the results and wider utilization of the designed educational intervention.

Recommendations pertaining to the nurses:

Attendance of conferences is feasible for nurses to upgrade their knowledge about new colostomy system as percutaneous colostomy.

A continuing educations program should be planned and offered on regular basis for the patients and their families to explain the procedure and methods of coping.

Recommendations pertaining to hospital administration:

Employ team concept (heath educator, medicine, nursing and others) to discuss plan of care to provide continuity of care and to build trust relationships with patient and family.

Educational booklets, handouts are provided for teaching patients and their families. Must be provided in order to change their pattern of life.

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