

Effect of Educational Nursing Intervention on Knowledge and Practices of Patients with Implantable Port Catheter and Undergoing Chemotherapy

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ABSTRACT

Port systems play an important role in daily care of oncology patients. It provides safe and reliable vascular access for patients on chemotherapy in general but is not without complications. Patient education increases adherence to medication and treatment regimens, leading to a more efficient and cost – effective health care delivery system. **Aim of the study:** Assess the effect of educational nursing intervention on knowledge and practice of patients with implantable port catheter undergoing chemotherapy. **Study design:** A quasi –experimental design with pre, post assessment. **Setting:** This study was conducted at the Radiotherapy oncology and nuclear Medicine center (outpatients' clinic) affiliated to Ain Shams University Hospital. **Subjects:** A purposive sample of 50 patients from both sexes, alert, connected with implantable port catheter. **Data collection:** data were collected using the following two tools: 1-Patient's knowledge assessment questionnaire to assess patients' knowledge regarding the port catheter care. 2- Port catheter care observational checklists to assess patient's practice regarding port catheter care. **Results:** there were highly significance difference between mean and standard deviation of patient's knowledge scores, practice scores and complications warning signs pre and post educational nursing intervention. Also, there was significance difference between mean and standard deviation of extravasation, and patients' anxiety level pre and post educational nursing intervention. **Conclusion:** Educational nursing intervention has positive effect on knowledge and practice of patients with implantable port catheter. **Recommendations:** An Arabic illustrated booklet about implanted port catheter should be distributed for each patient newly connected with implantable port catheter and undergoing chemotherapy.

Key words: implanted port catheter, chemotherapy, patient education.

INTRODUCTION

Totally implanted ports (TIP) have become an integral part of patient care, particularly in oncology departments where patients require repeated venous access for the implementation and monitoring of therapy. TIP consists of a plastic or titanium chamber with a compressed silicon septum

designed for puncture by a non-coring needle. TIP has proven to be a valuable alternative to external systems owing to lower complication rates from infection and greater ease of use (Mahe, Elalamy & Farge-Bancel, 2008).

An implantable port (IP) is a medical device that consists of two components. The first is a thin, soft, plastic tube called a

catheter that is typically inserted (tunneled) under the skin of the chest and courses over the collarbone into a large neck vein. The catheter tubing connects to the second component called a reservoir that is a small disc implanted under the skin of the upper chest. The port reservoir is a small bump underneath the skin, which can be felt but is not visible on the outside of the body (Heibl et al., 2010).

Patient education increases adherence to medication and treatment regimens, leading to a more efficient and cost – effective health care delivery system. Patient education ensures continuity of care and reduces the complications related to illness and incidence of disorder \disease. Patient education maximizes the individual's independence with exercise programs and activities that promote independence in activities of daily living as well as continuity of care (Rankin, Stallings & London, 2009).

Nurses require astute assessment skills and sound clinical judgment to identify and successfully manage central venous access device (CVAD) complications. They are in a unique position to advocate for and adopt into practice evidence-based clinical practice guidelines to support the management of CVADs. As members of a multidisciplinary team, nurses are important links in the chain of patient care. Economic exigencies, the current nursing shortage, the chronicity of cancer and the ever-increasing complexity of treatment are driving forces that compel nurses to develop in-depth knowledge of CVAD management. Positive patient outcomes are demonstrated by completion of therapy free of complications and patient satisfaction with care (Royal College of Nursing [RCN], 2010).

Significance of the Study:

Implantable ports have some risks. The risks may include infections, blockage or clots, and other problems that are less

common (infiltration and extravasations). There are special instructions for catheters or ports that reduce the risk of these problems. Adequate care of the catheter and patient education are essential factors in the successful longevity of the catheter; in patients with small veins, obese arms, or venous thrombosis from prior chemotherapy.

Aim of the study

The present study aimed to:

Assess the effect of educational nursing intervention on knowledge and practice of patients with implantable port catheter undergoing chemotherapy. This aim was achieved through the following:

1. Assessing the patients' knowledge and practices regarding care of port catheter.
2. Developing and implementing educational nursing intervention based on patients' actual need assessment.
3. Evaluate the effect of educational nursing intervention on knowledge and practice of patients with implantable port catheter and undergoing chemotherapy.

Research hypothesis:

The current study hypothesized that:

The educational nursing intervention will improve and affect the knowledge and practices of patients undergoing chemotherapy via implantable port catheter positively.

SUBJECTS AND METHODS

Research Design:

A quasi-experimental design with pre and post assessment was utilized to accomplish the aim of this study.

I. Technical Design:

The technical design entails the research setting, subjects, and tools for data collection.

Research Setting:

The present study was conducted at the radiotherapy oncology and nuclear medicine center (out patients' clinic) affiliated to Ain Shams University Hospital.

Subjects:

A purposive sample of 50 patients was recruited from the radiotherapy oncology and nuclear medicine center (out patients' clinic).

Inclusion criteria:

The inclusion criteria include the following: Adult patients, males and females, alert, connected with implantable port catheter, educated or has first degree relative educated, not given any instructions about implantable port catheter care, and free from any psychiatric or mental disorder.

Tools of data collection:

Two tools were used in the current study as follows:

1- Patient's knowledge assessment questionnaire:

This questionnaire was used to assess patients' knowledge regarding the port catheter care. This questionnaire was adapted from (Serpil & Ayfer, 2009) and modified by the researcher. Face and content validity were done. It was written in simple Arabic language. It included the following two parts:

- Patients' demographic data including age, gender, education level, occupation.....etc.

- Patients' knowledge regarding implantable port catheter and its care as definition, indications, complications, care.....etc.

Scoring system

The second part of the patient's knowledge assessment questionnaire consisted of 50 true and false questions. One score was given for each correct answer, and Zero for the incorrect one. The total scores of the knowledge assessment questionnaire were 50 scores, distributed as follow:

Part I: General information about implanted port catheter (18 scores).

Part II: Information about insertion of implanted port catheter (10 scores).

Part III: Information about care of implanted port catheter (19 scores).

Part IV: Information about removal of implanted port catheter (3 scores).

The knowledge level was categorized into satisfactory and unsatisfactory as follow:

- $\geq 70\%$ considered satisfactory level of knowledge.
- $< 70\%$ considered unsatisfactory level of knowledge.

2- Port catheter care observational checklists:

These checklists were developed by the researcher after reviewing the recent related literatures to assess patient's practices regarding port catheter care (dressing, flushing and recapping).

Scoring system

The observational checklists included the following:

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- Dressing checklist (20 steps).
- Flushing checklist (15 steps).
- Recapping checklist (13 steps).

Every step that was done correctly by the patient was given one score. While the steps that were not done or done incorrectly were given zero score.

The total scores for every checklist and for all checklists was calculated and changed into percentage. The level of practice was categorized into adequate or inadequate as follow:

- $\geq 70\%$ considered adequate level of practice.
- $< 70\%$ considered inadequate level of practice.

II- Operational Design:

- **Preparatory phase:** the recent related literatures, and theoretical knowledge of various aspects of the study using books, articles, internet and periodicals to develop data collection tools and develop a booklet containing educational guidelines.

The educational nursing intervention for patients with implanted port catheter:

The content of the educational nursing intervention were developed by the researcher in simple Arabic language guided by related literatures. The guidelines divide into 4 parts as follow; (1) General knowledge about implanted port catheter which includes (definition, components, uses, advantages, sites of insertion, insertion, and removal). (2) General instructions about care of catheter. (3) Complications and their signs and symptoms and how to deal with it. (4) Care of catheter which includes (flushing, dressing, recapping).

The educational nursing intervention were revised by a group of five experts in Medical Surgical Nursing and two expert physicians from the radiotherapy oncology and nuclear medicine center at Ain Shams University for the content validity. Based on the opinion of the panel of experts, some modifications were done, and then the final form was developed.

- **Validity & Reliability:**

Validity: Face and content validity of the suggested tools were assessed through a jury of seven experts (Four assistant professors and one professor of Medical Surgical Nursing as well as two expert physicians in the field of oncology, faculty of medicine at Ain-Shams University). They reviewed the instrument for clarity, relevance, comprehensiveness, understanding, and easiness for administration. Minor modifications were required.

Reliability: Alpha Chronbach test was used to measure the internal consistency of the tools used in the current study. The first tool was reliable at 0.85 and the second tool was reliable at 0.80.

- **Pilot Study:**

A pilot study was carried out on 10% of the study sample (5 patients). The pilot study was done in radiotherapy oncology and nuclear medicine center (out patients' clinic) affiliated to Ain Shams University Hospital to ensure clarity, applicability, relevance and time needed for each tool as well as feasibility of the study. Based on the findings of the pilot study, necessary modifications and clarifications of some questions were done to have more applicable tools for data collection. Some questions and items were rephrased and then the final forms were developed. Patients included in the pilot study were excluded from the study sample.

- **Field Work :**

It included the implementation and evaluation phase.

- **Implementation phase**

- This phase started by developing and translation of the tools for data collection which have taken about 3 months, starting from February 2012 to May 2012.
- Data collection was started and completed within 6 months, from September 2013 till the end of February 2014.
- Purpose of the study was simply explained to patients who agree to participate in the study prior to any data collection; the study tools were filled in and completed by the researcher on two stages (pre and post educational nursing intervention).
- Collection of data begun by the patient's knowledge assessment questionnaire; it was completed within 10- 20 min. After that, observational checklists were filled in by the researcher through observing the patient during flushing, recapping and dressing. Each procedure was finished within about 5- 10 min.
- Three sessions for each patient were established for explanation of the content of educational nursing intervention (each session lasted 60- 90 min).
- The patient was given the booklet containing educational guidelines to start reading it at home and underlines any clarifications about the items of guidelines.

- The practical part was introduced to the patients through demonstration and re-demonstration.
- The researcher was available at the radiotherapy oncology and nuclear medicine center individually 3days/week at morning and afternoon shifts to collect data and to conduct the educational nursing intervention.

- **Evaluation phase**

After the final session, the same tools were distributed again for each patient to be answered and the patients re-observed during performance of the same tool to evaluate the effect of implementing the educational nursing intervention.

III- Administrative Design

An official letter was obtained from the faculty of nursing, Ain Shams University and directed to the director of oncology out patients' clinic at which the study was conducted, explaining the purpose of the study and requesting the permission for data collection from the study group.

IV- Statistical Design

The collected data were organized, categorized, tabulated and statistically analyzed using the Statistical Package for Social Science (SPSS), version 15. Data were presented in tables using numbers and percentages. The statistical analysis included percentage, mean and standard deviation (SD), Chi-square (X^2) and paired T test.

Significance of results was described as follows:

- Non significant difference at $p > 0.05$.
- Significant difference at $P < 0.05$.

- Highly significant difference at $P < 0.001$.

RESULTS

Table (1): shows the demographic characteristics of the patients under the study, it reveals the mean age for patients included in the study were 48.6 ± 10.5 . Also, reveals that majority of the patients (70 %) were females. Concerning the educational level of the patients included in the study, about one third of patients (34%) were secondary educated and (14%) of patients were highly educated.

As regards working status, about one third of the patients (30%) were house wife and 5% of the patients were on pension. Regarding marital status, about two fifth of the patients (39%) were married. Concerning living status, 44% of the patients were living with their families.

Regarding the percentage distribution of number of patients with satisfactory level

of knowledge pre and post educational nursing intervention, **table 2** reveals that, all of the study patients have unsatisfactory level of knowledge regarding general knowledge about implanted port catheter followed by port catheter care (90%) of the study patients have unsatisfactory level of knowledge. All items of knowledge improved post educational nursing intervention with highly significant difference.

Table 3 shows that all the study patients have inadequate level of practice regarding flushing of implanted port catheter. While 8% of the patients have inadequate level of practice regarding dressing of implanted port catheter. Moreover, there is a highly significant difference between level of practice regarding all procedures pre and post educational nursing intervention.

Table 4 shows that there are highly significant differences between knowledge, practice score pre and post educational nursing intervention ($p < 0.001$).

Table (1): Number and percentage distribution of patient's demographic characteristics (No=50)

Patient characteristics	NO	%
Age (in years)		
- 30	3	6.0%
30 – > 40	7	14.0%
40 – > 50	16	32.0%
50 – > 60	17	34.0%
± 60	7	14.0%
Mean + SD	48.6 + 10.5	
Gender:		
Male	15	30.0%
Female	35	70.0%
Education:		
Illiterate	14	28.0%
Primary	12	24.0%
Secondary	17	34.0%
University	7	14.0%
Working:		
Working	7	14.0%
not working	8	16.0%
house wife	30	60.0%
on pension	5	10.0%
Marital status:		
Married	39	78.0%
Not married	11	22.0%
Living status:		
Alone	6	12.0%
With family	44	88.0%

Table (2): Percentage distribution of satisfactory level of knowledge among the studied patients pre and post educational nursing intervention (No =50).

Knowledge items	Pre		Post		X ² test	
	Satisfactory		Satisfactory		X ²	P
	NO	%	NO	%		
• General information about implanted port catheter	0	0.0%	28	56.0%	38.8	0.000
• Insertion of implanted port catheter	7	14.0%	37	74.0%	36.5	0.000
• Implanted port catheter care	5	10.0%	40	80.0%	49.5	0.000
• Removal of implanted port catheter	15	30.0%	45	90.0%	37.5	0.000

Table (3) Number of patients with adequate level of practice regarding implanted port catheter pre and post educational nursing intervention (No =50).

Checklists	Pre		Post		X ² test	
	Adequate		Adequate		X ²	P
	NO	%	NO	%		
Flushing	0	0.0%	35	70.0%	53.8	0.000
Recapping	2	4.0%	40	80.0%	59.3	0.000
Dressing	4	8.0%	45	90.0%	67.3	0.000
Total	0	0.0%	39	78.0%	63.9	0.000

Table (4): Mean and Standard deviation of knowledge and practice scores pre and post educational nursing intervention (No= 50).

Items	Pre		Post		Paired T test	
	Mean	SD	Mean	SD	T	P value
Knowledge	20.2	4.9	29.6	7.9	10.5	< 0.001
Practice	15.4	3.6	36.2	6.3	15.7	< 0.001

compatible with **Smeltzer, Bare, Hinkle and Chaver (2010)** who reported that incidence of cancer is higher in men than in women.

DISCUSSION

The use of totally implantable venous access devices (TIVADs) has changed the care and quality of life for cancer patients treated with chemotherapy. TIVADs represent a convenient option when long-term venous access is indicated, particularly for administration of cytotoxic medications or intravenous targeted agents in cancer patients over a long period of time (**Ahmad et al., 2012**). As regards the patients under the study age, the present study revealed that; the mean age of the patients were 48.6 ± 10.5 years. This finding indicate that cancer was common among all age groups, and this matching with **Marzouk (2012)** who revealed that the mean age of the study group was 48 ± 16.9 years.

Regarding patients' gender, the present study revealed that; more than two thirds of the patients were women. These finding was in concordance with **Granziera et al. (2014)** who reported that the majority of their study group was females. This result not

The present study showed that, more than one third of the patients were secondary educated. This finding not compatible with **Bandyoadhyay et al. (2010)** who revealed in their study that, educational level was also established to be poor as less than half of the patients were illiterate, one third of them had primary education.

This study revealed that about two third of the patients were house wives. This finding was congruent with **Marzouk (2012)** who reported that, nearly two third of the study group were house wives. Regarding marital status the present study showed that, about three quadrants of the patients were married. This finding was congruent with **EL Leithy (2009)** who reported that, the majority of the patients were married.

Regarding patients' level of knowledge, the present study revealed that, the entire patients have unsatisfactory level of

knowledge pre educational nursing intervention; this may be because no health education was given for those patients about the implanted port and its care. This finding to some extent was compatible with **Yesilbalkan, Kir, Karadakovan and Uslu (2009)** who reported that when evaluating patient awareness of the port catheter, 76.0% of the subjects reported having no knowledge of it.

Although **Zieve (2012)** reported that, dressing is special bandages that block germs and keep the catheter site dry and clean, reported that the patient must learn how to change the dressing, he / she should change the dressing about once a week and must change it sooner if it becomes loose or gets wet or dirty. After some practice, it will get easier. In the same line **Fahy and Sockrider (2010)** also, reported that, special care in cleaning and bandaging the skin at the catheter site can decrease the risk of infection. The results of this study revealed that all patients have inadequate level of practice regarding dressing for site of port catheter. These findings may be due to the unavailability of nurses or doctors to teach patients how to care for their port catheters. However post implementation of educational nursing intervention, the results of the present study revealed that, the majority of patients have adequate level of practice regarding dressing for site of port catheter this may be due to presence of illustrating pictures on the booklet that was given for patients during educational nursing intervention. Also, **Liang (2011)** stated that keeping the port site clean at all times is very crucial. If an access needle is in place, it is covered with a dressing to keep the site clean and prevents the needle from dislocating. Mean while, **Weingart, Hsieh, Lane, and Cleary (2014)** reported that, an educational intervention should be created to address patients' knowledge deficits about care of the catheter, precautions taken when bathing to minimize the incidence of complications. He found in his study that many participants

expressed confidence in their knowledge of line care, some were uncertain about what to do if the dressing became loose or wet, or how to recognize an infection.

Another finding of this study is the inadequate level of practice regarding flushing of the port catheter pre educational nursing intervention. This finding may be due to the unknown information that flushing is crucial to maintain patency of the port catheter or the fear of dealing with the port catheter or because the technique is unknown and nobody teaches them how to perform it.

Post educational nursing intervention, the results of the study showed that, more than two thirds of the patients have adequate level of practice regarding flushing, this finding correspondent with **Chong, Chow, Kong and Ang (2013)** who stated that one of the primary interventions to prevent catheter occlusion is flushing the catheter adequately after each use. **Guiffant, Durussel, Flaud, Vigier, and Merckx (2012)** stated that, flushing with the correct solution and technique is then fundamental to maintain patency of the catheter. The effective flushing of these devices is a central element to assure long-lasting use.

Also, post educational nursing intervention the present study revealed that about four fifth of the patients have adequate level of practice regarding recapping. This result is in the same line with **Jennifer and Mannheim (2012)** who reported that, all the clamps in the catheter must be kept closed at all times. When changing the catheter dressing and after blood taken the clamps must be changed.

Regarding flushing, dressing, recapping the present study revealed that all of the patients have inadequate level of knowledge about them pre nursing intervention, this was in the same line with **Weingart, Hsieh, Lane and Cleary (2014)** who stated that, patient education may play a critical role in line

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safety in patients with implanted port. In their study some patients described knowledge deficits regarding loose dressings, wet dressings, and signs of infection. This result was contradicted with **Yesilbalkan, Kir, Karadakovan and Uslu (2009)** who reported in their study that, the patients' knowledge about them ranging from 25% to 74%.

CONCLUSION

Based on the findings of the present study, it can be concluded that:

Patients' knowledge regarding implantable port- A- cath has been improved significantly. Also, patients' practices regarding implantable port – A- cath care have been improved.

RECOMMENDATIONS

Based on the results of the present study, the following recommendations are suggested:

- An Arabic illustrated booklet about implanted port catheter should be distributed for each patient newly connected with implantable port catheter.
- Designing continuous educational sessions for patients with implantable port catheter in hospitals in addition to media such as: educational DVD to help in preventing complications of implanted port catheter.
- Further researches about implanted port catheter, its complications and their prevention are highly recommended to maintain optimal health of the patients.

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