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Effect of Evidence-Based Guidelines Regarding Port-A-Cath Care on Oncology Nurses' Performance and Patients' Health Outcomes

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Abstract

Implantable Port-A- Catheter is a central vascular access device that provides direct access to large blood vessels. The device has become an integral part of daily oncology nursing clinical care, improving nurses' knowledge and practice is crucial for compliance minimizing complications, and improving patient outcomes. Aim: It was to evaluate the effect of evidence-based guidelines regarding port-a-Cath care on oncology nurses' performance and patients' health outcomes. Design: A quasi-experimental design was used. Setting: medical oncology and nuclear medicine unit and inpatient unit at Benha University Hospital, Egypt. Sample: A convenient sample of (67) Oncology nurses and a purposive sample of 134 patients who connected to port-a-cath., they were classified into two groups; group A was assessed pre-evidence-based nursing guidelines intervention; and group B was evaluated post-evidence-based nursing guidelines intervention. Both groups of patients had been cared for by the same group of studied nurses, concerning the port-a-catheter procedure. Tools for data collection: A structured Questionnaire, nurse's practice observational Checklist, Patient assessment, and clinical health outcomes data assessment. Results: There were statistically significant differences between pre & post-EBNGI regarding the knowledge and practice of the studied nurses regarding care for the patient with port-A-catheter. Patients (Group B) who had been cared for by the same group of studied nurses post-EBNGI had l fewer complications as compared with patients (Group A) who had been cared for by the same group of studied nurses pre-EBNGI, but this decrease was not statistically significant difference in relation to their health outcomes . Conclusions: The evidence-based nursing guidelines intervention were helpful in the improvement of the nurses' knowledge and practices for the prevention of port-A-catheter-related complications among oncology patients. Recommendations: Periodic educational programs regarding port-a-catheter care for nurses who provide care for patients connected to port-a-cath.

Keywords: Evidence-Based Guidelines , Health Outcomes, Oncology Nurses, Patients', Port- A- Cath ,Performance.

1.Introduction

Cancer ranks as a leading cause of death and an important barrier to increasing life expectancy in every country of the world. According to estimates from the World Health Organization (WHO) in 2019, cancer is the first or second leading cause of death before the age of 70 years in 112 of 183 countries. Worldwide, an estimated 19.3 million new cancer cases (18.1 million excluding nonmelanoma skin cancer) and almost 10.0 million cancer deaths (9.9 million excluding nonmelanoma skin cancer) occurred in 2020 **[15]**

Effective and reliable venous access is one of the cornerstones of modern medical therapy for oncology patients that demands stable venous access for chemotherapy, blood products, antibiotic administration, and parenteral nutrition as well as fluid resuscitation. The invention of the port catheters has revolutionized the current management of oncologic diseases since it play an important role in the management of cancer patients & can also decrease patient anxiety associated with repeated venipunctures overcoming the need for serial peripheral access **[9,12]**

Currently, these devices have become an integral part of daily clinical routine, so the care and maintenance of implanted ports require vigilance and attention to prevent complications and maintain their patency, it includes flushing, locking, dressing, change of needles, and minimizing the risk of contamination. Therefore, nurses who are knowledgeable and competent in the basic aspects of porta-cath care able to ensure specific patient needs are met and prevent further complications **[4]** Evidence-based practice (EBP) is an approach to healthcare that utilizes the most current research available to improve the health and safety of patients while reducing overall costs and variation in health outcomes. Evidence-based nursing practice considers the best research evidence on the care topic, along with clinical expertise of the nurse, and patient preferences. Additionally, the competencies of intensive care (ICU) nurses in their healthcare environment, have increased with the acquisition of new responsibilities associated with new care and devices for critical patients **[3]**

Significance of the study

Modern chemotherapeutic management depends upon repeated safe access to the venous system as peripheral veins are rapidly destroyed by repeated venipuncture and long-term chemotherapy. The introduction of porta cath in routine clinical practice has facilitated vascular access for the safe administration of chemotherapeutic drugs and supportive care. Thus, long-term venous access devices (VADs) have helped to overcome the need for repeated peripheral or central venous puncture **[2]**

According to **[7]** who studied improving the knowledge of portacath care for nurses, the number of patients with a portacath in hospitals is increasing. Since nurses are more likely to be responsible for the care and maintenance of a porta cath, this research is focusing on providing proper knowledge and training for nurses to enhance high quality and safety in health

Increasing nurses' knowledge and skills related to porta cath is essential to minimize complications. So, providing education and training to nurses regarding a port-a-cath increases the knowledge and confidence of

the nurses as well as enhances safety, compliance to treatment, and quality for patients with these devices.

2.Aim of the Study:

To evaluate the effect of evidence-based guidelines regarding port-a-Cath care on oncology nurses' performance and patients' health**:** as the end points of care, substantial changes in the health indicators by Implement nursing guidelines as signs and symptoms of infection, signs of edema, thrombosis and bleeding and pain intensity

Research hypotheses:

H (1): The evidence-based guidelines could be improve nurses' knowledge regarding care of patient with port-a -cath.

H (2): The evidence-based practice guidelines was enhance to best nurses' practice regarding care of patient with port- a -cath.

H (3): The evidence-based nursing guidelines had a positive effect on the patients' health outcomes with port-a -cath.

Research Design: A Quasi experimental design was conducted to achieve the aim of this study.

Setting:

Medical oncology and nuclear medicine unit and inpatient unit at Benha University Hospital, Egypt.

3.Subjects:

A convenient sample of (67) Oncology nurses who are providing care for oncology patients with portacath included in the study. Purposive sample of 134 patients who connected to port-a-cath., they were classified into two groups;group A was assessed pre- evidence based nursing guidelines intervention ,and group B post-evidanece based nursing guidelines intervention.Both groups of patients had been cared by the same group of studied nurses, concerning the port-a-catheter procedure.

Tools: Four tools were utilized to collect study data as fllows:

Tool I: A structure Questionnaire: This tool was developed by the researcher through review of related literature, it included two parts:

Part 1: Nurses' Demographic Data: it was concerned with the nurses' characteristics such as, gender, level of education, marital status, years of experience and attending training related the care of port –a-Cath.

Part 2: port-a Cath Knowledge Questionnaire: It was adapted from (**Alkan, 2017, Hoa,2019)** to assess nurses' knowledge about port-a-Cath It included 19 multiple choice questions and classified as follows; Definition and site of portacath (Two question).Indication and contraindicationof portacath (two question).Benefits of portacath (one question).Complication of portacath (three question).Nursing care regarding portacath (two question).Equipment for portacath needle insertion(seven question) Port-a-Cath needle removal and heparin usage (two questions with two score).

Scoring system for knowledge: Each question scored one (1) for correct answer, and each incorrect answer scored zero (0). These scores were converted into a percent as the following:

- <50% of total score was concerned with poor level of knowledge(<9.5score).
- from 50% - <75 % of total score was concerned with average level of knowledge (9.5- <14.25score).
- Score from 75% to 100 % of total score was concerned with satisfactory (good) level of knowledge(14.25-19 score)

Tool II: Nurse's Practice Observational Checklist: This was adapted from **(Omnicare, 2016)** to assess nurses' practices regarding the care for patients with port –a- Cath and prevention of related complications. It covered 6 main items, as follows:

1-The insertion preparation (Pre accessing) (11 steps).
2-Accessing (insertion) of porta Cath (18 steps).
3- Obtaining blood specimens through a implanted venous access (12 steps).
4- The heparin flushing de accessing (removal) of porta Cath (18 steps).
5-Administeration of medications or fluids (16 steps).
6- Port-a-catheter care and patient education (5 steps).

Scoring system: The correct step was done and scored one, and those wrong scored zero. These scores were summed and converted into a percentage. The total score of checklists was 80 scores and considered 100%. It was categorized as follows:

- < 85% incompetent practice - >85% competent practice

Tool III – Patients' Assessment: It aimed to assess the patient's medical health history and clinical outcomes for patients with port-a-Cath-related complications including the following parts:

Part 1: Patients' Personal data: It was concerned with the patient's characteristics such as gender, age marital status, and level of education.

Part 2: Patients' Medical Health History: It was concerned with the past and present patients' medical health history as past illness and current diagnosis.

Tool IV: Clinical Health Outcomes Assessment: It was designed through a review of related literature by the researcher, and was aimed to assess physical health outcomes for patients with porta Cath. including the following parameters:

1. Infection Assessment: It was designed by **(Machat, S., 2019),** it included the following:

a. Vital signs as body temperature, and pulse.
b. The local manifestation of infection at the site of the port-a-Cath as redness, hotness, and bloody exudate response included two options as absents scored (Zero) or presents scored (one). In addition, assess the patient's WBC and CRP

2. **Edema Rating Scale:** It was adopted from (Gorski, L, 2021) and used to assess infiltration of the porta Cath.Scoring system: Infiltration scale was rated 1 to 4, which is based on clinical criteria by checking the affected area-the catheter site and the grade is determined by measuring the size of the blenching as well as the presence of pain. the answer for each one included two option as absents it scored (Zero) or presents it scored (one).

3. **Assessment Catheter-Related Thrombosis or Bleeding:**

adopted from **(Wall C,2016))** It aims to assess: Port-a-Cath patency by flushing infusion or aspiration to observe signs and symptoms of upper peripheral thrombosis such as jaw or shoulder pain, The response both absents scored (zero) and present scored (one). In addition, assess the patient's PT, APTT, and INR. **Catheter sites for bleeding:** Bloody exudate at the port-a-catheter insertion site was assessed. It was adopted from **(Patel, A. R.,,2019).** The answer for each one included two options absents it scored (Zero) or presents it scored (one)

4. **Numerical Pain Rating Scale:** It was adopted by (Knight, L.,2019) to assess the patient's complaint of port-a-catheter site pain intensity due to hematoma. Pain Rating Scale (NPRS) is a subjective measure in which individuals rate their pain on a ten-point numerical scale. Scoring system: The scale is composed of 0 (no pain at all) to 10 (worst imaginable pain). The average of the 3 ratings will be used to represent the patient's level of pain post-insertion.

Method

I. **Administrative, and Ethical Consideration:** Official permission to conduct the study was obtained from the administrator of the previously mentioned setting and permission from the Dean of the Faculty of Nursing. The research approval was obtained from the Ethical Committee of the Faculty of Nursing at Benha University before starting the study. A clear explanation of the nature, aims, and expected outcomes of the study was clarified to nurses before data collection. The researcher was assured of maintaining anonymity and confidentiality of the objective data. The study sample was informed that they are allowed to choose the participation or not in the study and they have the right to withdraw from the study at any time.

II. **Preparatory Phase:** It included an extensive review of related and recent literature and studies related to various aspects of the study knowledge and practice using national and international resources to prepare the tools for data collection. The tools are translated into Arabic language by the researcher. The tools were tested by the following tests:

Validity and Reliability:

Content validity was done by five experts one professor and two assistant professors in the medical surgical nursing field at the Faculty of Nursing, Benha University, and two professor oncology field at the Faculty of Medicine, Benha University to check the relevancy, clarity, comprehensiveness, and applicability of the study tools. According to their opinions, minor modifications were made and the final form was developed. The content validation of the studied tools was modified according to the opinions of experts. Their opinions were elicited regarding the format, layout, consistency, accuracy, and relevancy of the tools. The designed knowledge questionnaire was reliable utilizing Inter-rater reliability with **Cronbach's Alpha** =0.730.

Pilot Study:

After the tools had been designed, 10% (6 nurses) of nurses who are providing care for patients connected to porta Cath were tested through a pilot study and excluded from the result, which was done before embarking on the fieldwork to test the applicability of the study and the clarity, feasibility, objectivity of the developed tools and to estimate the time needed to complete its items. According to the result of the pilot study, no changes were required.

III Field of Work: The data was collected for 7 months, from the beginning of April 2023 until the end of October 2023. The Data collection was done through the assessment phase, the planning and Implementation phase, and the evaluation phase as follows :

Assessment phase:

Once the researcher got consent from the nurses, an interview was started by assessing their sociodemographic characteristics, and knowledge using tool I, and the nurses' practice was observed by the researcher using tool II regarding porta Cath care as a baseline data assessment pre-evidence-based nursing guidelines (PEBNGI) intervention, as well as the patient's health outcomes were assessed for Group A of oncology patients' problems and complications related port-a-Cath through 48 hours of insertion to assess the effect of nurses' knowledge and practice on patients' outcomes using tool III and as a baseline data assessment before nursing guidelines intervention. It was associated with their sociodemographic characteristics medical health history and clinical health outcomes assessment.

Planning and Implementation Phase

Based on the initial assessment of the nurse's knowledge and practice about port-a- Cath care, the researcher designed and prepared an evidence-based nursing guideline.

· The recruited nurses were divided into 15 groups of different numbers from 3-5 nurses for each group according to the nurse's working time. Each group was attending a teaching room separately during the morning and afternoon shifts. Teaching sessions were classified into two sessions, each session took time of 40 min. The content of the sessions was divided as follows:

1st session: at the beginning of the session, the explanation was given to the participants including information about Port-a-Cath, using lectures and group discussion. This session took about 40 min. for each group.

2nd session: The researcher demonstrated the skills related to port-a-cath insertion and preparation (pre-insertion), the accessing (insertion) of porta Cath, obtaining blood specimens through an implanted venous access, heparin flushing de accessing (removal) of Porta-a-Cath, administration of medications or fluids and Port-a-catheter care. then the re-demonstration of the procedures was done by the nurses, the duration of this session was 40. minutes. Each skill session included displaying simple training videos for practical skills related to port-a-Cath care. Each session started with a summary of what had been discussed in the previous session and the objective of the new session, using simple

Arabic language, also the session ended with a summary of its contents and feedback from the staff who attended the sessions to ensure that he/she got the maximum benefit. The booklet had illustrative pictures to attract their attention, and motivation and support their learning and practicing. At the end of the session, the researcher informed the nurses that they would evaluate their knowledge and practice immediately, and determined the time of the follow-up plan.

Evaluation phase:

This phase aimed to evaluate the effectiveness of nursing evidence-based guidelines intervention on nurses' knowledge and practice as well as patients' health outcomes. The nurses' knowledge and practice were evaluated three times using tool I (part 2) and tool II immediate, 4th, and 8th weeks post an evidence-based guidelines intervention. Evaluate Patients' health outcomes using tool III for group B of studied oncology patients who were assigned care by the same studied nurses through 48 hours, and 2nd and 4th week of Port-a-Cath insertion post nursing-guidelines intervention.

Statistical analysis of the data

Data was fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using numbers and percentages. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation, and median. The significance of the obtained results was judged at the 5% level.

4.Results

Table (1) Illustrates the distribution of the studied nurses about their Sociodemographic data. It noticed that of (92.5%) females compared to males (7.5%). They were in different age groups. The largest age group was 30 – <40 years, accounting for 41.8% of the participants, followed by 40 – <50 years (34.3%), 20 – <30 years (16.4%), and 50-60 years (7.5%). The majority of nurses were married (82.1%), and the minority of them were single (14.9%). In terms of qualifications, the majority of nurses had attended a technical institute (64.2%), followed by those with a diploma (25.4%), bachelor's degree (9.0%), and postgraduate qualification (1.5%). The occupation of nurses was predominantly nurses (89.6%), with a smaller percentage being nursing specialists (10.4%). In terms of years of experience in nursing, the majority of nurses had more than 10 years of experience (61.2%), followed by 5-10 years (32.8%) and 5 years or less (6.0%).

Table (1) Distribution of the Studied nurses in relation to their Socio-Demographic Data (N=67).

Socio–Demographic Data	Study sample N= 67	
	No.	%
1- Sex		
• Male	5	7.5
• Female	62	92.5
- Age in years		
• 20– <30 years	11	16.4
• 30 –<40 years	28	41.8
• 40 – <50 years	23	34.3
• 50-60 years	5	7.5
- Marital Status		
• Single	10	14.9
• Married	55	82.1
• Divorce	2	3.0
4- Qualifications		
• Diploma	17	25.4
• Technical institute	43	64.2
• Bachelor	6	9.0
• Postgraduate	1	1.5
5- Occupation		
• Nurse	60	89.6
• Nursing specialist	7	10.4
Years of Experience in nursing		
• 5y<	4	6.0
• 5y-10y	22	32.8
• >10y	41	61.2

Table (2) Mean score, of the studied oncology nurses about their knowledge about porta Cath pre and post Evidence base Nursing Guidelines implementation (EBNGI) (n= 67)

Variables	Pre- EBNGI	Post- EBNGI Immediate	4th weeks	8th weeks	F (p_0)	Pre vs. post-EBNGI		
	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.		p_1	p_2	p_3
Definition of port-a-Cath +site of port-a-Cath (2Q)	1.19 ± 0.68	1.88 ± 0.33	1.90 ± 0.31	1.91 ± 0.29	45.398* (<0.001*)	<0.001*	<0.001*	<0.001*
Indications of port-a-Cath + Contraindications of port-a-Cath (2Q)	0.97 ± 0.65	1.84 ± 0.37	1.84 ± 0.37	1.87 ± 0.34	64.551* (<0.001*)	<0.001*	<0.001*	<0.001*
Benefits of port-a-Cath(1Q)	0.36 ± 0.48	0.94 ± 0.24	.87 ± 0.34	0.97 ± 0.17	53.426* (<0.001*)	<0.001*	<0.001*	<0.001*
Complications of port-a-Cath (3Q)	1.06 ± 0.69	2.84 ± 0.37	2.79 ± 0.57	2.82 ± 0.39	210.163* (<0.001*)	<0.001*	<0.001*	<0.001*
Nursing care regarding port-a-Cath(2Q)	1.01 ± 0.71	1.87 ± 0.39	1.94 ± 0.24	1.97 ± 0.17	91.851* (<0.001*)	<0.001*	<0.001*	<0.001*
Equipment for port-a-Cath needle insertion(7Q)	1.07 ± 1.35	6.64 ± 0.54	6.70 ± 0.52	6.42 ± 1.16	547.119* (<0.001*)	<0.001*	<0.001*	<0.001*
Port-a-Cath needle removal and heparin usage (2Q)	0.27 ± 0.51	1.96 ± 0.21	1.97 ± 0.17	1.93 ± 0.26	473.025* (<0.001*)	<0.001*	<0.001*	<0.001*
Overall								
Total score (19)	**5.94 ± 2.37**	**17.96 ± 0.96**	**18.00 ± 1.14**	**17.88 ± 1.43**	968.088* (<0.001*)	<0.001*	<0.001*	<0.001*
% score	**31.26 ± 12.49**	**94.50 ± 5.05**	**94.74 ± 6.01**	**94.11 ± 7.53**				

Table (2) Shows mean score, standard deviation, and significant difference of the studied oncology nurses' knowledge about porta Cath pre and post EBNGI. It clarified that, there was a high statistical significance difference between pre and post EBNGI (post immediate, 4thand 8th week) with significant difference at P =<0.00. The results indicate that participants improved significantly across all variables post EBNGI.The highest mean score were 0.94 ± 0.24 and 1.96 ± 0.21concerning benefits of port-a-Cath and Port-a-Cath needle removal and heparin usage post immediate EBNGI , at 4th week benefits of port-a-Cath declined to .87 ± 0.34 , at 8th week benefits of port-a increased to 0.97 ± 0.17 but Port-a-Cath needle removal and heparin usage slightly increased to 1.97 ± 0.17, at 4th week and slightly declined to 1.93 ± 0.26 , at 8th week .

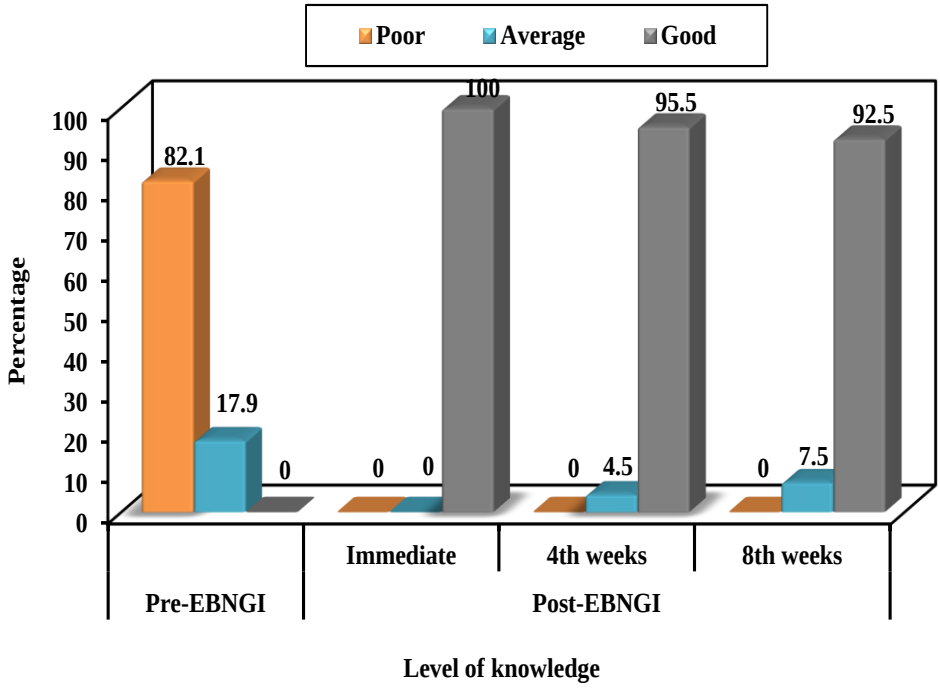

Fig. (1) Overall knowledge about porta Cath pre and post-program implementation of the studied nurses in relation (n=67)

This figure revealed that, the level of nurses' knowledge pre EBNGI 82.1% was poor and only 17.9% had an average level and increased to a good level for all nurses (100%) immediate post and most of them were 4th and 8th week post-EBNGI (95.5% and 92.5% of studied oncology nurses, respectively.

Table (3) Mean score, of the studied oncology nurses according to their level of practice related to porta Cath accessing pre and post-BBNGI (n= 67).

	Post -EBNGI	Pre vs. post-EBNGI

Variables (Total Score)	Pre-EBNGI Mean ± SD.	Immediate Mean ± SD.	4th weeks Mean ± SD.	8th weeks Mean ± SD.	F (p0)	p1	p2	p3
I. Insertion preparation (Pre-Port Accessing) (11 steps)	7.22 ± 2.56	9.94 ± 0.97	10.84 ± 0.45	10.88 ± 0.37	103.687* (<0.001*)	<0.001*	<0.001*	<0.001*
II. Accessing (insertion) of porta Cath (18 steps)	9.33 ± 2.16	15.76 ± 1.44	17.73 ± 0.62	17.66 ± 0.57	584.524* (<0.001*)	<0.001*	<0.001*	<0.001*
III. Obtaining Blood Specimens: (12 steps)	8.79 ± 1.76	11.43 ± 0.72	11.61 ± 0.49	11.73 ± 0.54	126.981* (<0.001*)	<0.001*	<0.001*	<0.001*
IV. Heparin flushing de accessing (removal) of porta Cath(18 steps)	12.39 ± 2.23	17.10 ± 1.20	17.69 ± 0.56	17.85 ± 0.36	284.816* (<0.001*)	<0.001*	<0.001*	<0.001*
V. Administration of medications or fluids (16 steps	9.21 ± 2.57	13.40 ± 2.07	15.36 ± 0.87	15.61 ± 0.65	211.876* (<0.001*)	<0.001*	<0.001*	<0.001*
VI. Porta catheter care (5 steps)	3.31 ± 1.29	4.90 ± 0.31	4.90 ± 0.31	4.93 ± 0.32	87.501* (<0.001*)	<0.001*	<0.001*	<0.001*
Overall Total score	50.25 ± 10.95	72.54 ± 3.99	78.12 ± 1.29	78.66 ± 1.33	364.243* (<0.001*)	<0.001*	<0.001*	<0.001*
% score	**62.82 ± 13.69**	**90.67 ± 4.98**	**97.65 ± 1.61**	**98.32 ± 1.67**				

Table 3) shows mean score, standard deviation, and significant difference of the studied oncology nurses according to their level of practice related to porta Cath accessing pre and post EBNGI. It reveals that, there were a high statistical significance difference between pre and post EBNGI (P =<0.001). The highest mean score were 4.90 ± 0.31and 11.43 ± 0.72concerning Porta catheter care and Obtaining Blood Specimens immediate post EBNGI, at 4th and 8th week Porta catheter care consistent with 4.90 ± 0.31, at 4th and 8th week Obtaining Blood Specimens slightly increased to 11.61 ± 0.49 and 11.73 ± 0.54),respectively.

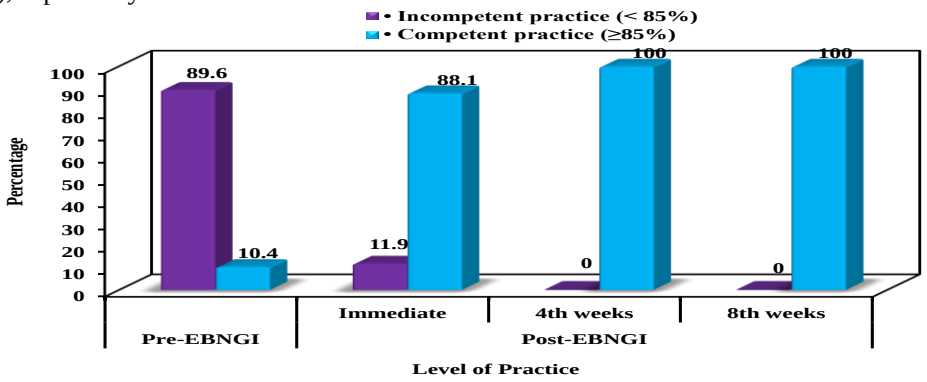

Fig. (2) Overall practice about porta Cath pre and post EBNGI of the studied nurses (n= 67)

This figure revealed that, the level of studied oncology nurses practice pre and post EBNGI. It revealed that, mean percent score for studied nurses practice pre implementing phase were (10.4%) of total score with competent level and increased to (88%) in immediate post then reach to (100%), 4th and 8th week post EBNGI of studied oncology nurses, respectively.

Table (4) Correlation between Knowledge and Practice (n = 67)

	Pre - EBNGI	Post - EBNGI

			Immediate	4th weeks	8th weeks
Knowledge vs. Practice	r	0.124	0.394*	0.392*	0.630*
	P	0.314	0.001*	0.001*	<0.001*

Table 4) it presents correlation between total knowledge of the studied oncology nurses and their total practices level. It revealed that, there was positive correlation between total knowledge of the studied nurses and their total practices level with statistically significant difference between total knowledge of the studied nurses and their total practices level (p=0.001).

Table (5) Correlation between nurses' Knowledge, practice and patient health outcomes regarding their vital signs and pain pre and post EBNGI (n = 67) (average)

variables		**Knowledge**		**Practice**	
		r	**p**	**R**	**p**
Temperature	**Pre**	0.065	0.603	-0.008	0.951
	Post	0.034	0.782	0.158	0.201
Pulse	**Pre**	0.002	0.988	0.271*	0.027*
	Post	0.017	0.894	-0.029	0.818
Pain score	**Pre**	0.003	0.984	0.048	0.697
	Post	0.075	0.549	-0.162	0.191

Table (5) This table shows that there was an improvement in practice related pulse from P 0.988 pre-EBNGI to P 0.027 post-EBNGI. Also, there were no significant correlation concerning temperature and pain score respectively.

Table (6) Relation between nurses' knowledge, practice and patient health outcomes pre and post EBNGI (n = 67) (average)

	Pre			**Post**		
	N	**% Score For Knowledge Mean ± SD.**	**% Score For Practice Mean ± SD.**	**N**	**% Score For Knowledge Mean ± SD.**	**% Score For Practice Mean ± SD.**
Chills						
Present	**9**	34.50 ± 14.91	71.53 ± 10.44	**3**	91.81 ± 7.09	94.19 ± 3.41
Absent	**58**	30.76 ± 12.15	61.47 ± 13.70	**64**	94.57 ± 3.95	95.64 ± 1.96
t (p)		**0.834(0.407)**	**2.105* (0.039*)**		**1.144 (0.257)**	**1.213 (0.229)**
Redness						
Present	**9**	34.50 ± 14.91	71.53 ± 10.44	**3**	91.81 ± 7.09	94.19 ± 3.41
Absent	**58**	30.76 ± 12.15	61.47 ± 13.70	**64**	94.57 ± 3.95	95.64 ± 1.96
t (p)		**0.834 (0.407)**	**2.105* (0.039*)**		**1.144 (0.257)**	**1.213 (0.229)**
Hotness						
Present	**9**	34.50 ± 14.91	71.53 ± 10.44	**3**	91.81 ± 7.09	94.19 ± 3.41
Absent	**58**	30.76 ± 12.15	61.47 ± 13.70	**64**	94.57 ± 3.95	95.64 ± 1.96
t (p)		**0.834 (0.407)**	**2.105* (0.039*)**		**1.144 (0.257)**	**1.213 (0.229)**
Exudate at port insertion site		**0.291 (0.772)**	**0.603 (0.548)**		**–**	**–**
Present	**3**	33.33 ± 16.92	67.50 ± 21.25	**1**	98.25#	95.03#
Absent	**64**	31.17 ± 12.42	62.60 ± 13.45	**66**	94.39 ± 4.10	95.58 ± 2.04
t (p)		**0.291 (0.772)**	**0.603 (0.548)**		**–**	**–**
WBCs						
Normal	**32**	31.74 ± 12.14	64.65 ± 12.86	**16**	93.42 ± 4.23	95.19 ± 2.91
Abnormal	**35**	30.83 ± 12.96	61.14 ± 14.38	**51**	94.77 ± 4.04	95.69 ± 1.68
t (p)		**0.298 (0.767)**	**1.048 (0.298)**		**1.154 (0.253)**	**0.663 (0.515)**

Table (6) Cont,Relation between nurses' knowledge, practice and patient health outcomes pre and post EBNGI (n = 67)

Platelet count						
Normal	**59**	31.49 ± 12.65	62.90 ± 13.81	**28**	94.55 ± 3.65	95.58 ± 2.21
Abnormal	**8**	29.61 ± 11.91	62.19 ± 13.62	**39**	94.38 ± 4.43	95.57 ± 1.92
t (p)		**0.398 (0.692)**	**0.138 (0.891)**		**0.168 (0.867)**	**0.006 (0.995)**
C-reactive protein (CRP)						
Normal	**57**	30.84 ± 12.32	63.44 ± 12.68	**55**	94.26 ± 4.25	95.47 ± 2.11
Abnormal	**10**	33.68 ± 13.86	59.25 ± 18.89	**12**	95.32 ± 3.29	96.03 ± 1.62
t (p)		**0.661 (0.511)**	**0.892 (0.376)**		**0.813 (0.419)**	**0.850 (0.399)**
Prothrombine time (PT)						
Normal	**60**	31.67 ± 12.76	62.65 ± 14.11	**50**	94.32 ± 4.48	95.64 ± 2.03
Abnormal	**7**	27.82 ± 9.95	64.29 ± 10.02	**17**	94.84 ± 2.74	95.39 ± 2.09
t (p)		**0.769 (0.445)**	**0.298 (0.767)**		**0.453 (0.652)**	**0.428 (0.670)**
INR						
Normal	**61**	31.49 ± 12.73	62.38 ± 14.15	**40**	94.39 ± 4.10	95.53 ± 2.14
Abnormal	**6**	28.95 ± 10.39	67.29 ± 6.68	**27**	94.54 ± 4.17	95.64 ± 1.89
t (p)		**0.473 (0.637)**	**0.837 (0.405)**		**0.152 (0.880)**	**0.231 (0.818)**
Difficulty with infusion						
Present	**13**	35.63 ± 12.74	67.60 ± 12.95	**7**	93.23 ± 5.31	94.73 ± 3.07
Absent	**54**	30.21 ± 12.32	61.67 ± 13.72	**60**	94.59 ± 3.96	95.67 ± 1.88
		1.413 (0.162)	**1.413 (0.162)**		**0.828 (0.411)**	**0.796 (0.454)**
Difficulty with aspiration						
Present	**13**	35.63 ± 12.74	67.60 ± 12.95	**7**	93.23 ± 5.31	94.73 ± 3.07
Absent	**54**	30.21 ± 12.32	61.67 ± 13.72	**60**	94.59 ± 3.96	95.67 ± 1.88
t (p)		**1.413 (0.162)**	**1.413 (0.162)**		**0.828 (0.411)**	**0.796 (0.454)**

Table (6) shows relation between knowledge and practice with different parameters, complication assessment post implementing of evidence-based nursing guidelines. It revealed that, there was no significance correlation between knowledge and practice with different parameters (P 0.454)

5.Discussion

A Port-A-Catheter is a commonly used device for patients who require long-term venous access, such as those receiving chemotherapy or other treatments for oncology patients. **[9]** .However, there are risks associated with the insertion and management of this device, making it crucial for nurses to have the necessary knowledge and skills to prevent complications and provide safe care. In-service training can help improve nurses' understanding and proficiency in handling Port-A-Cath devices **[13].**

Nurses Demographic characteristics : Regarding to gender, the present study illustrated that, the majority of the studied nurses were female. This finding was in agreement with **[5],** who reported in their study about "Complications and Management of Totally Implantable Central Venous Access Ports in Cancer Patients at a University Hospital in Oman", it revealed that, the

majority of the studied nurses were females. **In relation to age**, the current study revealed that, near one third of the studied nurses their age ranged from 30-40years old. This finding is consistent with the study **[6]** about "Effect of Educational Program on Nurses knowledge & Practice towards Patients with Implantable Port Catheter" and stated that the age of the studied nurses was from 30-40 years old. **In respect to the level of nurse's education**, the present study revealed that, nearly two-thirds of the studied nurses held degrees from technical institutes of nursing. This finding is on the same line with the study conducted by **[16]** titled "Oncology Nurses' Knowledge and Practices regarding Safe Administration of Intravenous Chemotherapy "and reported that, more than half of oncology nurses held degrees from technical institutes of nursing. **Regarding nurses' years of experience,** the present study revealed that more than half of nurses had more than 10 years of experience This finding is consistent with **[10]** titled "Effect of educational guidelines on nurses' performance regarding prevention of port-a- catheter complication among patients undergoing chemotherapy" and they reported that more than half of nurses had more than 10 years of experience.

Regarding total knowledge, about porta Cath, the present study indicated that the most of studied nurses had poor knowledge pre implemented of evidence-based guidelines about the port-a-Cath definition, site, indications, contraindications, benefits, complications, nursing care, and equipment. This may be attributed to they had exposed to a low in-service education training before program. While the majority of studied oncology nurses had good level of knowledge immediate post,4th and 8th week post implementing of evidence-based nursing guidelines. So, it was justified by implementing evidence-based nursing guidelines for the studied nurses. This result indicated that the positive effect of the given educational guidelines for the studied oncology nurses, reflects that the nurses need updating and refreshing their knowledge. This finding compatible with the findings of study by **[1],** titled "Nurses' Knowledge Levels about Port Catheter Care: a study of the palliative care working committee of the Turkish Oncology Group" who reported that poor knowledge levels of the studied nurses were found in pretest.

Regarding to the level of nurses' practice about different aspects of an implanted port, the first assessment of the studied nurse's level of performance regarding port-Cath care before applying evidence-based guidelines indicated that their practice showed incompetent level pre the evidence-based guidelines sessions of training regarding port-a-Cath care. From the researcher's opinion, it might be attributed to lack of their clinical exposure to refreshing educational training program updates. So, hospitals, effort should be directed towards enhancing education among nurses and the staff nurses must have access to updates of recent information frequently, learning resources and continuous educational services give opportunities regarding care of patients with an implanted port who are undergoing chemotherapy. This study result goes in the same line with **[14]** who conducted a study that is aimed to "improve the care and maintenance of port-a-Cath among the nursing staff by introducing a care bundle and documented that has significantly improved the quality of handling of port-a-Cath and reduction in infections. Also they stated that 100% efficiency was observed in hand washing practices and the use of alcohol-based hand rub before accessing the port-a-Cath among their study participants.

Regarding Clinical based data assessment of Infection, the findings of the present study showed that, infection as an indicated by chills, redness, hotness, and bloody exudate among the minority of both groups A and B pre and post EBNGI, respectively . While at 2nd and 4th week post applied of the guidelines, infection signs and symptoms were declined among group B, This result is in agreement with the study conducted by **[1] entitled** "Nurses' Knowledge Levels about Port Catheter Care" and revealed that the minority of studied patients experienced signs and symptoms of infection. In addition, this finding is consistent with study was conducted by **[14]** about " Improvement in care and maintenance of Port-A-Cath following the introduction of care" bundle " who documented that no new cases of CLABSI were reported to date after the intervention and stated that proper training for care and maintenance of port-a-Cath help in improving quality of health care and minimizing the costs by preventing CLABSIs and extravasations.

Regarding the edema around the site of porta Cath, the findings of the present study showed that, edema as an indicated by infiltration around the site of porta Cath and the grade is determined by measuring the size of the blenching as well as the presence of pain between group A and Group B pre and post. found that, the minority of both group developed grad 1 and 2 infiltration while 2nd and 4th week post applying the guidelines, edema signs and symptoms were declined. There was a high statistical significance difference between 48 hr in Group A and 4 weeks in Group B. This finding is in the same line with the finding reported by **[10]** who revealed that the incidence of complication related to infiltration such as edema decreased after implementation of educational modules.

Concerning the pain score according to the current study findings, there were a significant difference between group A & B post-EBNGI, these findings agreed with **[8]** who studied Pain reduction during port-à-cath catheter puncture using local anaesthesia with EMLA and documented that according to numerical pain Rating Scale the patients experienced less pain after 40 min application of local anesthesia cream.

Regarding clinical based data assessment related thrombosis or bleeding, thromboembolic complications which represent the second most important issue that accompanies the insertion of CVC, at 2nd and 4th week post application of the educated guidelines, thrombosis signs and symptoms were declined among group B. It may contribute to patients' effectiveness education

observation and outcomes are essential for proper management of oncology patients who are undergoing chemotherapy treatment. The health care providers for enhancing patient safety and reduces complications and unnecessary hospital admissions. In this respect, **[7]** emphasized the importance of recognizing that staff nurses have a significant role in reducing the complications of port-a-Cath and are directly in charge of ensuring patient safety as well as increasing the quality of hospital care.

The present study showed significant improvement in the oncology nurses' practice regarding porta Cath flushing using heparin, as before teaching EBNG they used to use 5000 IU of heparin before accessing porta Cath, this in addition to another 5000Iu after drug administration, while the standardized protocol was followed by them after teaching the evidence-based guidelines. According to the evidence, 500 IU of heparin post drug.

Correlation between nurses' overall knowledge and overall practice.

The present study revealed that there was positive correlation between nurses' total knowledge and their practice post immediate,4th and 8th week post implementation of evidence-based nursing guidelines. From the researcher's point of view, the nurses practice was positively related to knowledge because knowledge is an important part that promotes nurses' behavior and attitude change. Therefore, when people have adequate and correct information, they mostly became eligible for achieving better performance level. Additionally, this result is supported by **[11]** who reported that, there were a statistically significance correlations between nurses' overall knowledge and practices. From the researcher point of view, this finding displayed that educational guideline accomplished their purpose in improving nurses' practices regarding management of port-a-cath.

Correlation and relation between nurse's Knowledge, practice, sociodemographic characteristics and with patient health outcomes group A and B pre and post EBNGI, respectively. The present research supported the effectiveness of continuing nurses' education and training to improve their knowledge and practice in the same line with **[7]** titled "Improving the Knowledge of Port-A-Cath Care for Nurses" reported that continuous training sessions and education opportunities are essential to maintain nursing knowledge levels and skills competencies. To ensure high quality and safe care, healthcare settings must create opportunities and environments for ongoing professional development of nurses. In doing so, need to facilitate the development of nursing staff to move from the novice nurse to the expert nurse. The present study revealed that there were a positive correlation between knowledge and practice with patient health outcomes between group A and B of patients pre and post EBNGI, respectively with high significant improvement between them concerning reducing complications,

6. Conclusion

Based on the results of the current study, it concluded that an improvement was found among studied oncology nurses concerning their knowledge and practice regarding port-a-Cath care with high significance difference post immediate, 4th and 8th week post implementing of evidence-based nursing guidelines compared with pre implementing which would result in a decrease of patients' complications who were assigned care post EBNGI. Also, there was a positive statistical significant correlation between knowledge and practice post implemented of EBNG

7. Recommendation

Based on the results of the present study, the following recommendations are suggested: 1-Apply evidence-based guidelines for all nurses that deal with implantable venous access port to reach the high quality of nursing care based on evidence.

1- Integrated evidence -based nursing practice into the education of nursing curriculum
2- Developing and designing an in- service training program for nurses' staff on applying the evidence -based nursing practice in the field of central venous access device management, especially for implantable port patients.
3- Periodic evaluation of nursing education programs that conducted for oncology nurses to ensure retention of knowledge and skills pertinent to port-a-Cath care.
4- Further research is required on a larger probability sample to ensure generalizability.

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