

Assess Nurses' Performance Regarding Care of Patient with Implanted Port Undergoing Chemotherapy

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Abstract

Background: Implanted port is an implanted device giving access to veins for patients with difficult veins or who need regular long-term administration of drugs often need to be delivered into a large central vein. **Aim:** The aim of this study was conducted to assess nurses' performance (knowledge, practice & attitude) for caring of patients with implanted port undergoing chemotherapy. **Research design:** An exploratory descriptive design was utilized to achieve the aim of the study. **Setting:** The study was conducted at the oncology department in the El-Demerdash Hospital affiliated to Ain Shams University. **Study subject:** A convenience sample of (50) nurses working in the previously mentioned unit within 6 months. **Tools:** three tools were used including: - **I-** Self-administered questionnaire: it used to assess nurses' knowledge, factors affecting on their performance and demographic characteristics of the study nurses. **II-** Nurses' performance observational checklist: it used to assess nurses' practice in caring of patients with implanted port. **III-** Likert scale: it used to assess nurses' attitude in caring of patients with implanted port. **Results & Conclusion:** more than three quarter of nurses had inadequate practice, and more than two third of them had inadequate knowledge while more than half of them had a positive attitude regarding caring of patients with implanted port. **Recommendations:** Further research are recommended periodically to study new approaches in the area of management of patients with implanted port and evaluate its reflection on patient's outcomes.

Key words: Implanted port catheter – Nurses' performance – Chemotherapy – Patients' care.

Introduction

Cancer begins in the cells, which are the building blocks of the body. Normally, the body forms new cells as the person needs them, replacing old cells that die. Sometimes this process goes wrong. New cells grow even when person doesn't need them, and old cells don't die when they should. These extra cells can form a mass called a tumor. Tumors can be benign or malignant, benign tumors aren't cancer while malignant ones are. Cells from malignant tumors can invade nearby tissues. They can also break away

and spread to other parts of the body, Cancer is not just one disease but many diseases. There are more than 100 different types of cancer. Most cancers are named for where they start (Kleinsmith, 2014).

Chemotherapy (chemo) is a type of treatment that includes a medication or combination of medications to treat cancer. The goal of Chemo is to stop or slow the growth of cancer cells. Chemo is considered a systemic therapy. This means it may affect person entire body. Chemo medications attack rapidly growing cancer cells, but they

can also affect healthy cells that grow rapidly, the effect of these medications on normal cells often causes chemo side effects as: a number of blood cells that divide rapidly can be damaged along with cancer cells, the good news is that many of these Chemo side effects can be managed (Wood & Miriam, 2017).

A port is a small medical appliance that is installed beneath the skin. A catheter connects the port to a vein. Under the skin, the port has a septum through which drugs can be injected and blood samples can be drawn many times, usually with less discomfort for the patient than a more typical "needle stick", the port is usually inserted into the upper chest (known as a "chest port"), just below the clavicle or collar bone, leaving the patient's hands free, designed to permit repeated access to the venous system for the parenteral delivery of medications, fluids, and nutritional solutions and for the sampling of venous blood (Michael, 2016).

Implantation of a port-a-Cath system involves a brief surgical procedure, it is placed completely inside the body, and one end of the catheter is inserted into the vein, while the other end is connected to the portal, which is placed completely under the skin. The tip of the catheter is located in a vein at a point just above the heart, Once the portal and catheter are in place and the incisions are healed, the patient will only notice a small bump under the skin, arm-placed systems these systems are placed under the skin, with the catheter inserted into a vein in the upper or lower arm. The tip of the catheter is located in the vein (Perry, 2016).

Many complications may affect port, such as; the area around the port may be swollen, tender, chest pain, wound infection, redness or drainage of pus around the port site or incisions, swelling of the neck, face or arm on the side where the port is inserted, shortness of breath or dizziness, so the patient should contact the doctor or oncology nurse immediately. If the port is to

be used the same day it is inserted, the Interventional radiologist will leave a needle in the port. Once the port is no longer required, it will be removed. The removal process will be similar to insertion, performed under local anesthetic and sedation (Mallon, 2017).

The nurse must give patient detailed instructions on taking care of his implanted port. Typical instructions are; wash his/her hands before touch the port to prevent infection, never touch its tip when the cap is off, follow instructions on cleaning the area and changing the bandage, keep air out of the port, make sure the top or clamps is on tight except during treatment, avoid any breaks or cuts in the catheter, flush a small amount of fluid into the port so it does not get blocked, and keep the port area from going underwater (Memorial Sloan Kettering Cancer Center, 2015).

Aim of the study

The aim of this study is to assess nurses' performance regarding care of patients with implanted port undergoing chemotherapy through:

- Assessing nurses' knowledge regarding the care of patients with implanted port undergoing chemotherapy.
- Assessing nurses' practices regarding care of patients with implanted port undergoing chemotherapy.
- Assessing nurses' attitude regarding care of patients with implanted port undergoing chemotherapy.

Research questions

This study was conducted for answering the following questions:

- What is the level of nurses' knowledge regarding the care of patients with implanted port undergoing chemotherapy?
- What is the level of nurses' practices regarding care of patients with

implanted port undergoing chemotherapy?

- What is the nurse' attitude regarding care of patients with implanted port undergoing chemotherapy?

Subject and methods

- **Technical design.**
- **Operational design.**
- **Administrative design.**
- **Statistical design.**

Technical design

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

Research design

A descriptive exploratory research design was utilized to meet the aim of the study. Exploratory research is a type of research conducted for a problem that has not been clearly defined. It determines the best research design, data collection methods & selection of subjects.

Setting

The study was carried out at the oncology department at EL- Demerdash Hospital affiliated to Ain Shams University. **Subjects:** A convenient sample included (50 nurses) caring for patients with implanted port undergoing chemotherapy in the previously mentioned unit and agreed to participate in this study.

Inclusion criteria

The Inclusion criteria of the current study include registered nurses working at the oncology department with experience at least 6 months.

Tools for data collection

Three tools were used to collect data of the study as following:

A- Self-administered questionnaire sheet (Appendix I): which divided into:

Part (1): concerned with **demographic characteristic data** of nurses under study that include: (age, gender, qualifications, experience..... etc).

Part (2): It developed by the researcher to assess nurses' knowledge & their performance regarding care of patients with implanted port undergoing chemotherapy, the tool developed based on reviewing of the current literature (Serpil & Ayfer, 2013 & Hayden, 2017 & Abramovitz, 2013).

It was translated into the simple Arabic language to suit the level of subjects who most rely on the use of Arabic language.

Nurses' Knowledge questionnaire (Appendix II): quoted from (Grady, 2015, Lemone & Burke, 2014) and it used to assess nurses' knowledge about implant port and consists of 8 parts. The total score was 66 grade. Each correct answer was given one grade and the incorrect answer was given zero. And categorized into unsatisfactory or satisfactory knowledge level as follows:

- <75% was considered unsatisfactory.
- ≥75% was considered satisfactory.

Third part: concerned with nurses' opinion about Factors affecting their performance and consists of 3 parts. The total score was 30 grade. Each correct answer was given one grade and the incorrect answer was given zero. And divided into two categories as follows:

- <75% had agree about factors effect on nurses' performance.
- ≥75% had disagreed about factors effect on nurses' performance.

II-Nurses practice observational checklists (Appendix III):

Used to assess nurses' practice regarding care of patients with implanted port undergoing chemotherapy; This part was quoted from (**Infusion Nurses Society,**

2014, Royal College of Nursing, 2014, European Journal of Cancer Care, 2016 & Götzsche & Nielsen, 2015), and modified by the researcher, that included 6 parts. The total score was 82 grade. Each correct answer was given one grade and the incorrect answer was given zero. A subtotal for nurses' practice was categorized into satisfactory or unsatisfactory practice as following:

- $\geq 80\%$ were considering satisfactory.
- $< 80\%$ was considered unsatisfactory.

III-Likert scale (Appendix IV):

Quoted from (Burns, Alvin, Burns & Ronald, 2016 & Gulati & Domchek, 2016). It was modified by the investigator after reviewing the relevant literature, to assess nurses' attitude regarding patients with an implanted port undergoing chemotherapy. It included statements that reflect the nurses' feelings and reactions toward patient with an implanted port undergoing chemotherapy. This port consists of (17) statement, the responses ranged from 0 (strongly agree) to 5 (strongly disagree). The score of items was summed up and the total multiplied by the number of items, give a mean score for nurses' attitude and the total mean were categorized into two categories as following:

- $< 75\%$ had a positive attitude.
- $\geq 75\%$ had a negative attitude.

II-Operational design

The operational design includes preparatory phase, validity & reliability, pilot study, and field work.

Preparatory phase:

It includes reviews of current and more recent national & international literature reviews concerning nurses' performance regarding cancer patients with an implanted port of various aspects of this issue in order to develop the data collection tools.

Tools validity & reliability (Appendix V):

A) **Testing the validity** of the proposed tools by using face and content validity, Face validity aimed to inspecting the items to determine whether the tools measure what supposed to measure. Content validity was conducted to determine whether the tool covers the aim. Validity was tested through a jury of (7) experts from Medical Surgical Nursing Department, Ain Shams University, (2) professor, (4) assistant professor and (1) lecture. The expertise reviewed tools for clarity, relevance, comprehensiveness, simplicity and applicability, minor modifications were done.

B) **Testing reliability:** was done by a cronbach's alpha test which used to examine whether the tools had internal consistency. The knowledge & practice tools had a good internal consistency & tests reached (0.78, 0.85, and 0.90) for factors affecting nurses' performance questionnaire tools, nurses' practice observational checklist and nurses' knowledge respectively. Indicating acceptable reliability.

Pilot study

Was conducted on 10% of nurses under the study in order to test the applicability of the developed study tools, the clarity of included questions as well as the average time needed to complete tools. The results obtained were studied and analyzed accordingly. Modifications were made for the final development of the tools, the study nurses who shared in the pilot study were excluded from the study sample.

1- **Field work:** Field work was included:

Assess Nurses' Performance Regarding Care of Patient with Implanted Port Undergoing Chemotherapy

a) Interviewing with (50) nurses caring for patients with implanted port undergoing chemotherapy in the previously mentioned setting to explain the aim of the study, the effect of this study on their performance as well as patient quality of care & take their approval to participate in the study prior to any data collection.

b) Assessing nurses' performance (knowledge, practice & attitude) regarding the care of patients with implanted port undergoing chemotherapy by using self-administer questionnaire tool, observational checklist & likert scale as follows:-

- The researcher filled the observational checklist in the morning and afternoon shifts during clinical work. Nurses were observed while working, it took about 40 minutes for every nurse personnel to be fulfilled by the researcher.
- Then self-administer questionnaire tool was filled by the nurses, it took about 40 minutes.
- The questionnaire tool about factors affecting nurses' performance was distributed to nurses after explaining the aim of the tool, it took about 30 minutes to be fulfilled.
- The Likert scale was filled by the nurses, it takes about 15 minutes.

c) Data collection was done 4 days per week (Sunday, Monday, Tuesday & Wednesday). Started in December 2016, it takes 8 hours from (9am to 1pm and from 3pm to 7pm) for 3 months in the previously mentioned setting in morning & afternoon shifts.

III-Administrative design

The study started with a letter indicating the aim of the study sent from the Faculty of Nursing Ain Shams University to the hospital director, and also to nursing director to obtain the permission and help to conduct the study in their facilities. The nurses included in the study were informed

about the aim of the study, an oral permission was obtained from them, and confidentiality was assured.

IV-Ethical consideration

Ethical approval was obtained from the scientific, ethical committee of Faculty of Nursing, Ain Shams University. The purpose of the study was explained to the nurses before conducting the study & oral consent was obtained from them to participate in the study. They were given an opportunity to withdraw from the study without giving a reason and they were assured that anonymity and confidentiality of information were protected. Ethics, values, culture & belief were respected.

V- Statistical design

Data entry & analysis were organized, categorized & analyzed using SPSS (Statistical Program for Social Science). Data were presented using descriptive statistics in the form of frequencies and percentages; description of qualitative variables as mean, SD and range, statistically significant was considered as $P < 0.05$, insignificant at $P > 0.05$ and highly significant at $P > 0.01$.

Result

Table (1): shows percentage distribution of Sociodemographic characteristics of study nurses. As 50% of nurses under study were aged less than 20 years old, while the mean \pm SD (34.67 \pm 4.28), (96%) of them were females and (95.2%) of them had the benefit of attending courses. Also, (58%) of the nurses didn't take training courses. While (40%) of them were having nursing diploma and (44%) of the study subject had an experience more than 10 years.

Table (2): Regarding total nurse's opinion about factors affecting their performance, shows that, (62%, 82% & 70%) of studied nurses had disagree opinion about

administration system factors, work environment factors & factors related to patient. And the total opinion about all factors affecting their performances had disagree opinion (76%).

Table (3): As regards to the total level of nurses' knowledge about all aspects of implanted port revealed that 72% of nurses had an unsatisfactory level of knowledge regarding caring for patients with implanted port undergoing chemotherapy. as; knowledge regarding cancer disease, administer chemotherapy, implanted port, care of implanted port before, during and after its implantation, complications of implanted port and infection control of implanted port the result was (74%, 60%, 78%, 72%, 98%, 58% & 80% respectively) of studied nurses had unsatisfactory knowledge regarding caring for patients with implanted port undergoing chemotherapy. While (82%) of them had satisfactory

knowledge regarding caring for patients with implanted port undergoing chemotherapy.

Table (4): Regarding the total level of nurses' practice on all aspects of implanted port **table (4)** revealed that 78% of nurses had an unsatisfactory level of practice regarding caring for patients with implanted port undergoing chemotherapy, as; flushing, recapping, dressing, preparation chemotherapy, administration chemotherapy and infection control of implanted port the result was (50%, 84%, 90%, 62%, 90% & 64% respectively) of studied nurses had an unsatisfactory practice regarding caring for patients with implanted port undergoing chemotherapy.

Table (5): Regarding the total level of nurses' attitude about all aspects of implanted port shows that (50%) of nurses under the study had a positive attitude regarding care of patient with implanted port undergoing chemotherapy.

Assess Nurses' Performance Regarding Care of Patient with Implanted Port Undergoing Chemotherapy

Table (1): Percentage distribution of Sociodemographic characteristics of study nurses (n=50).

Items	N	%
Age group (years):		
<20	25	50.0
20<30	4	8.0
30<40	6	12.0
40-50	15	30.0
Mean±SD	34.67±4.28	
Gender		
Male	2	4.0
Female	48	96.0
Qualifications		
Nursing Diploma	20	40
Technical health Institution	19	38
Bachelor of Nursing	11	22
Experience in chemotherapy unit		
>5	14	28
5-10	14	28
>10	22	44
Mean±SD	14.37±3.62	
Training about caring of patients undergoing chemotherapy		
Yes	21	42.0
No	29	58.0
Benefit		
Yes	20	95.2
No	1	4.8

Table (2): Percentage distribution of total nurse's opinion about factors affecting their performance (n=50).

Items	Agree		Disagree	
	N	%	N	%
Administration system	19	38.0	31	62.0
Work environment	9	18.0	41	82.0
Patient	15	30.0	35	70.0
Total opinion	12	24.0	38	76.0

Table (3): Percentage distribution of total nurses' Knowledge regarding care of patients with an implanted port undergoing chemotherapy (and=50).

Items	Satisfactory		Unsatisfactory	
	N	%	N	%
Nurses' Knowledge regarding cancer disease	33	26	17	74
Nurses' Knowledge regarding chemotherapy	20	82	30	18
Nurses' Knowledge regarding administer chemotherapy	37	40	13	60
Nurses' Knowledge regarding implanted port (port-A-Cath)	11	22	39	78
Nurses' Knowledge regarding the care of implanted port (port-A-Cath) before and during its implantation	15	28	35	72
Nurses' Knowledge regarding the care of implanted port (port-A-Cath) after its implantation	38	2	12	98
Nurses' Knowledge regarding complications of implanted port (port-A-Cath)	37	42	13	58
Nurses' Knowledge regarding infection control of implanted port (port-A-Cath)	10	20	40	80
Total Knowledge	14	28	36	72

Table (4): Percentage distribution of total nurses' practice regarding caring for patients with implanted port undergoing chemotherapy (and=50).

Items	Satisfactory		Unsatisfactory	
	N	%	N	%
Flushing of implanted port catheter regarding Care of Patients with Implanted Port Undergoing Chemotherapy	25	50.0	25	50.0
Recapping of the implanted port catheter	8	16.0	42	84.0
Dressing of the implanted port catheter	5	10.0	45	90.0
Preparation chemotherapy of implanted port catheter	19	38.0	31	62.0
Administer chemotherapy of the implanted port catheter	5	10.0	45	90.0
Infection control of implanted port catheter	18	36.0	32	64.0
Total practice	11	22.0	39	78.0

Table (5): Percentage distribution of total nurses' attitude regarding care of patients with implanted port undergoing chemotherapy (n=50).

Total nurses' attitude regarding care of patients with implanted port undergoing chemotherapy	N	%
Positive	25	50.0
I don't know	20	40.0
Negative	5	10.0

Discussion:

Hooda, Lalani, Fadoo, Billoo & et al.(2016) mentioned that a port - a -cath. (Port) is an implanted device giving access to veins for patients who need regular long-term administration of antibiotics or chemotherapy drugs. For patients with difficult veins, ports can also be used for withdrawing blood for blood tests (*Hauser & Christine, 2015*).

Gallieni, Pittiruti & Biffi, (2016) mentioned that there are potential problems /risks associated with port-a-Cath. as infection, risk of forming clots, air outside the lungs, irritation or blistering of the skin, dislocation of the catheter and very little risk of bruising, bleeding or damage to the blood vessels with the use of modern imaging technology. So, the nurses should have information and knowledge to teach the patient all instructions about implant port and how to do care for it to avoid potential risks and complications.

The main purpose of this study is to evaluate nurses' performance regarding care of patients with an implanted port undergoing chemotherapy through: 1. Assessing nurses' knowledge regarding care

of patient with an implanted port undergoing chemotherapy.2. Assessing nurse's opinion about factors affecting their performance regarding care of patients with an implanted port undergoing chemotherapy. 3. Assessing nurse's practice regarding care of patients with an implanted port undergoing chemotherapy. 4- Assessing nurses' attitude regarding care of patients with an implanted port undergoing chemotherapy.

Regarding demographic characteristics of the studied nurses the current study showed that, about half of nurses' ages were less than 20 years and had an experience more than 10 years.This may explain that young nurses are occupied on oncology units to tolerate the nature of the work and to acquire more experience; the study is consistent with *Nastoupil, Rose & Flower, (2016)* whose has revealed that about half of his studied subjects were less than 20 years old with years of experience more than 10 years.

As regard to training courses, the result of the present study showedthat, more than half of nurses didn't receive training course about management of patient with implanted port undergoing chemotherapy, in my point of view this may be due to lack of in-service training programs, the staff nurses did not

aware about the importance of implanted port and the severe complications that may occur if an error occurred during and after implantation process and there is no time for attending any extra training program as a result of work overload.

This result agrees with **Rampling, James & Papanastassiou, (2016)** who found that more than half of nurses didn't receive training courses about an implanted port so that overall, nurses had significant knowledge deficits of many aspects of implanted port as evidenced by the very low mean score they achieved.

Regarding nurses' opinions about factors affecting their performance, more than one third of nurses in the study reported that factors affecting their performance included, factors related to the administration system, factors related to work environment, factors related to patient effect. In my point of view this may be due to inadequate hospital work system, lack of motivations and rapid turnover that lead to lack of training and consequently lack of experienced nurses.

Pertaining to factors related to administration system most of nurses were unsatisfied about effect of administration system on their performance, it may be due to shortage of nurses, lack of continuous training, conflict among nurses groups and lack of time for nursing work, this was in agreement with **Moorhead, Johnson & Mass, (2017)**, whose study revealed that more than two thirds of his study sample were unsatisfied about work system due to increase of nurses and its training, cooperation between nurses and adequate time for nursing work.

As regards to nurses' opinion about the effect of work environment on their performance, the current study revealed that more than fourth of studied sample were unsatisfied about work environment due to absence of procedure books, lack of infection control & lack of ventilation, this result was confirmed by **Shader, Hauser &**

Christine, (2017) who indicated that more than half of studied nurses were unsatisfied about work environment related to shortage of procedure books, lack of infection control & ventilation.

Related to a nurse's opinion about the effect of patient on their performance, the current study revealed that more than two third of the study sample were unsatisfied about patient effect on their performance as reported by them this was due to the patient was feeling pain which affected negatively in the cooperative with nurses, this was agreed with **Smith & Hillner, (2015)** who found a negative relation between patient pain and nurses' performance.

Concerning the total level of nurses' knowledge about all aspects of implanted port as; knowledge regarding cancer disease, chemotherapy, administer chemotherapy, implanted port, care of implanted port before, during and after its implantation, complications of implanted port and infection control of implanted port the study revealed that more than two third of nurses had an unsatisfactory level of knowledge regarding caring of patients with implanted port undergoing chemotherapy.

From the researcher point of view the lack of nurses knowledge may be due to few educational programs in oncology departments, the wide base for nurses' education in Egypt is diploma, lack of awareness about the importance of implanted port, high turnover of nurses and annual leaves for child care that effect on number of nurses and this was supported by **Shulman et al., (2017)** entitled for "Five Things Physicians and Patients Should Question" who reported that insufficient knowledge has been attributed to deficiency in orientation or training and high turnover of nurses, whenever the United Arab Emirates Ministry of Health requires nurses to engage in lifelong learning to maintain and improve professional knowledge.

Similar results were reported by **Bayraktar and Erdil, Cheney et al, (2016)**

entitled for "Non-small cell lung cancer" whose study revealed that half of nurses had unsatisfactory knowledge about all phases of implanted port care which result in improper practice. While the study was incongruent with **Hossain, Azzoli & Temin, (2017)** entitled for "Chemotherapy for Stage IV Non-Small-Cell Lung Cancer" who reported that, about three quarters of nurses have satisfactory knowledge about implanted port care and only one quarter have an unsatisfactory knowledge.

Concerning the total level of nurses' practice about all aspect of an implanted port as; flushing, recapping, dressing, preparation chemotherapy, administration chemotherapy and infection control of implanted port the study revealed that more than three quarters of nurses had unsatisfactory level of practice regarding caring of patient with implanted port undergoing chemotherapy. The lack of nurse's practice may be due to few training courses were conducted in oncology departments, high turnover of nurses and annual leaves that effect on number of nurses and this was supported by **national cancer institute (2016)** entitled for "Obesity and Cancer Risk" who reported that insufficient practice has been attributed to deficiency in orientation or training and high turnover of nurses.

Similar results were reported by **McCulley, Michelle, Greenwell & Pamela, (2015)** entitled for "Molecular therapeutics: 21st-century medicine" whose study revealed that about two third of nurses had an unsatisfactory practice about all phases of an implanted port care. Whenever the study was incongruent with **Akl, Kahale, Ballout, Barba & Yosunico, (2014)** entitled for "Parenteral anticoagulation in ambulatory patients with cancer" who reported that about three fifth of nurses have satisfactory practice about implanted port care.

Concerning the total level of nurses' attitude about all aspects of an implanted port the study revealed that about half of nurses of the current study had appositve attitude, and about one third of them didn't

act the positive attitude toward care of patient with implanted port undergoing chemotherapy. While the other nurses about less than one quarter had a negative attitude regarding care of patient with implanted port undergoing chemotherapy. This was supported by **Ralph, (2016)** entitled for "Galen on Cancer"who reported that more than half of their study nurse had appositve attitude about caring of patient with implanted port. Whenever the study was incongruent with **Hajdu, (2015)** entitled for "A note from history: landmarks in history of cancer, part 2"whoreported that about three fifth of nurses had a negative attitude about implanted port care.

In summary; results of the present study revealed that there is a need to focus on the development of nursing staff knowledge and practice regarding care of patients with an implanted port undergoing chemotherapy, so the effort should be directed towards enhancing creativity among nurses. The nurses must have access to update information, learning resources and continuous educational opportunities.

Conclusion

Based on the findings of the current study, it can be concluded that: 1-More than three quarter of the studied nurses had disagreed opinion about factors affecting their performance. 2-More than two third of the studied nurses had unsatisfactory knowledge regarding the care of patients with implanted port undergoing chemotherapy with statistical significance difference. 3-More than three quarter of nurses had unsatisfactory practice with high statistical significance. While half of them had a positive attitude regarding care of patients with implanted port undergoing chemotherapy.

Recommendations

Based on the results of the current research, the following suggestions for future research and practice are proposed

Assess Nurses' Performance Regarding Care of Patient with Implanted Port Undergoing Chemotherapy

1. Continuous evaluation of nurses' knowledge and practice is essential to identify nurses' needs and factors affecting their performance in oncology units.

2. Close supervision and teaching on the spot during work is needed to ensure that the quality of care is provided by nursing care of patients with implanted port undergoing chemotherapy.

3. Developing continuous educational programs, including evidence based guidelines based on needs assessment for nurses to improve their performance and quality of care regarding care of patients with implanted port undergoing chemotherapy.

4. Developing a simplified and comprehensive educational guidelines and booklet about nursing management for patients with implanted port undergoing chemotherapy.

5. Developing educational programs/self-learning packaging (SLP) for infection control and follow aseptic techniques during care of patients.

6. Nursing curriculum must include theoretical and practical sessions about the management of implanted port for different nursing categories (diploma – technical – bachelor).

7. Replication of the study of a large probability sample and different geographical areas to generalize the results.

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Assess Nurses' Performance Regarding Care of Patient with Implanted Port Undergoing Chemotherapy

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