

EFFECT OF SELF-LEARNING PACKAGE ON NURSES' PERFORMANCE REGARDING CARE OF PATIENTS WITH IMPLANTED PORT CATHETER UNDERGOING CHEMOTHERAPY

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Abstract

*The implanted port catheter is a device that is placed under the skin, it uses when intravenous therapy is needed for a long time as chemotherapy. Several complications are possible when using the implanted port catheter. The role of nurse is important to begin caring of patient with implanted port undergoing chemotherapy, and the self-learning package is designed to help nurses understand practice. **Aim:** The aim of this study was evaluated effect of self-learning package to assess nurses' performance (knowledge& practice) for caring of patients with implanted port undergoing chemotherapy. **Research design:** A quasi-experimental design research design was utilized to meet the aim of the study. **Setting:** The study was conducted at the oncology department in El-Demerdash Hospital affiliated to Ain Shams University. **Study subject:** A convenience sample of all available (30) nurses working in the previously mentioned unit within 6 months. **Tools:** two tools were used including: I- Self-administered questionnaire: it used to assess nurses' knowledge 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 undergoing chemotherapy. **Results & Conclusion:** more than three quarters of nurses had inadequate practice, and more than half of them had inadequate knowledge regarding caring of patients with implanted port undergoing chemotherapy. **Recommendations:** Further research are recommended periodically to further study to be carried out in different settings on a larger sample for a wider utilization of the SLP, in order to achieve generalization of the results.*

Keywords: Implanted Port Catheter – Nurses' Performance – Chemotherapy – Patients' Care– Self-Learning Package.

INTRODUCTION

Chemotherapy is a drug treatment that uses powerful chemicals to kill fast-growing cells in the body. Chemotherapy is most often used to treat cancer, since cancer cells grow and multiply much more quickly than most cells in the body. Many different chemotherapy drugs are available. Though chemotherapy is an effective way to treat many types of cancer, chemotherapy treatment also carries a risk of side effects. Some chemotherapy side effects are mild and treatable, while others can cause serious complications (Alfarouk, et al., 2022).

Implanted port is a type of central line. A central line is like an intravenous (IV) line. But it is much longer than a regular IV and goes all the way up to a vein near the heart or just inside the heart. A patient can get medicine, fluids, blood, or nutrition through a central line. It also can be used to draw blood. Implantable ports are devices that a doctor inserts under the skin and into a vein (**Yaacob, et al., 2021**).

Implantation of a port is considered a minor procedure performed under local or general anesthesia by an interventional radiologist or surgeon. With one or two small incisions, the catheter is threaded into the vein and attached to the portal chamber. The procedure is typically completed within one hour. A simple x-ray is used for post-operative imaging to confirm appropriate placement of the port. For a few days after the procedure, the patient may experience discomfort at the insertion site, which can be managed by NSAIDs (**Song, et al., 2021**).

Nursing management of Port-A-Cath includes assessment, dressing changes and cleansing, injection cap changes, and maintenance of catheter patency. The exact frequency and procedures for these requirements vary by type of Port-A-Cath and institution, so it is important to follow specific institution's policies and procedures (**Freel, et al., 2022**).

The patient does not do any tiring activities for the first few days after surgery. Make sure that, the patient understand and follow any special instructions that the nurse is given. When an incision is healed, patient may go back to normal activities. Check with the nurse about specific activities such as jogging, swimming, and tennis (**Sona, et al., 2023**).

Self-Learning package (SLP) is a successful method of learning applied for orientation and in a continuing education programs for learner, currently it is being applied in a variety of innovative continuing education process and projects. In addition, the design of SLP that permits the learner to gain knowledge by asking the instruction only when there is a problem or difficult question (**Doerr & Hecht, 2022**).

AIM OF THE STUDY

This study is aimed to evaluate the effect of self-learning package on nurses' performance regarding care of patients with implanted port catheter undergoing chemotherapy in the oncology department through the following:-

- Assess nurses' level of knowledge regarding care of patients with implanted port catheter undergoing chemotherapy.
- Assess nurses' level of practice regarding care of patients with implanted port catheter undergoing chemotherapy.
- Develop and implement self-learning package on nurses' performance regarding care of patients with implanted port catheter undergoing chemotherapy.
- Evaluating the effect of self-learning package on nurses' performance regarding care of patients with implanted port catheter undergoing chemotherapy.

Research Hypothesis

This study had been conducted for a significant positive change in:

1. Nurses Knowledge regarding care of patients with implanted port catheter undergoing chemotherapy post implementation of self-learning package.
2. Nurse's practice regarding care of patients with implanted port catheter undergoing chemotherapy post implementation of Self-learning Package.

Subject and Methods

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

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

Research design: A quasi-experimental design was utilized to meet the aim of the study, and the research hypothesis.

Research setting

The study was carried out in oncology department in EL- Demerdash Hospital affiliated to Ain Shams University.

Subjects

A convenience subjects included all available (30) nurses caring for patients with implanted port catheter undergoing chemo-therapy in the previously mentioned unit was involved 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: Two tools were used to collect data of the study as following:-

I- Nurses self-administered questionnaire (Appendix I):

It was developed by the researcher based on reviewing current & relevant literatures. It was translated into simple Arabic language to suit the level of the subjects, it is consisted of two parts:

A- The first part: concerned with the **demographic characteristics** of the nurses under study as: age, gender, nursing qualification, years of experience, training courses, and benefit from training courses.

B- The second part: Nurses' level of Knowledge: - It was used to assess nurses' knowledge regarding care for patients with implanted port catheter undergoing chemotherapy, it included MCQ and true and false questions, it was adapted from (**Abramovitz, 2017, Alberts, Johnson & Lewis, et al., 2019, Akl, Kahale & Ballout, 2018 & Bagri, Leong & Plowman, 2018**) and modified by the researcher including 65 questions divided into 8 parts. Each item was given 0 for incorrect response and 1 for correct response.

A subtotal & total mean for nurses' knowledge was categorized into unsatisfactory or satisfactory knowledge level as follows:-

- < 85% (< 55 marks) was considered unsatisfactory.
- ≥85% (≥ 55 marks) was considered satisfactory.

II-Nurses practice observational checklists (Appendix III):

It was used to assess nurses' practice regarding care of patients with implanted port catheter undergoing chemotherapy, adapted from (Hentrich, Schalk, Schmidt-Hieber, 2018, Axelrad, Lichtiger & Yajnik, 2019, Anisimov, Sikora & Pawelec, 2019, Baylin & Ohm, 2018), and it was consisted of 87 steps, each step was given (0) for not done or done incorrectly and (1) for done correctly.

A subtotal & total mean for nurses practice was categorized into satisfactory or unsatisfactory practice as following:

- ≥ 90% was consider satisfactory.
- <90% was consider unsatisfactory.

II-Operational design:

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

Preparatory phase: It included reviewing of related literature, and theoretical knowledge of various aspects of the study using periodicals, magazines, articles, books and internet.

1- Tools validity & reliability (Appendix V):

A) Testing the validity of the proposed tools by using face and content validity, Face validity aimed to measure what it claims to measure based on face value (King et al., 2021). Content validity was the degree to which a test or assessment instrument evaluates all aspects of the topic, construct, or behavior that it is designed to measure (Hong et al., 2023). 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, comprehensive-ness, 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 (0.99, 0.98, and 0.85) for nurses' practice observational checklist and nurses' knowledge respectively. Indicating acceptable reliability.

2- Pilot study: was carried out for 10% of nurses (3 nurses) from the oncology department to test the clarity and applicability of the study tools and determining the time needed for conducting the study. Based on the finding of the pilot study and expertise opinions necessary modification was made.

3- Field work: Was from the beginning of August 2022 up to the end of February 2023. The self-learning package was implemented to achieve the aim of the current study.

Self-learning package designed to be practical and theoretical nature addressing knowledge and practice necessary for nurses caring patients with implanted port catheter undergoing chemotherapy.

Self-learning package included four phases as follow:

- a- Assessment phase.
- b- Planning phase.
- c- Implementation phase.
- d- Evaluation phase.

a- Assessment phase:

Health care providers needs various skills towards learning for successful independent study. This step involved learner conducting a self-evaluation of their current situation and study habits also involves evaluating past experiences with independent learning. Signs of readiness for self-directed learning include being autonomous, organized, self-disciplined, able to communicate effectively, and able to accept constructive feedback and engage in self-evaluation and self-reflection.

At the beginning of interview; the researcher welcomed nurses and, explained the purpose, duration, activity of the study and take their oral approval to participate in the study prior to data collection, the average time needed for (tool no 1) to assess personal characteristics and assess their knowledge was around 30 minutes and the time for the observational checklist was about 30-45 minutes.

b- Planning phase: by setting learning objective:

- Communication of learning objectives between a researcher and the health care providers included:
- Objectives of the study.
- Structure and sequence of activities
- Timeline for completion of activities
- Details about resource materials for each objective
- Details about grading procedures
- Feedback and evaluation as each objective is completed
- Meeting plan with the advising instructor
- Agreement of unit policies, such as a policy on late assignments.

c- Implementation phase: as follow

- 1) The work was done by interviewing the available nurses and explain the aim of the study, what was needed to be done and take their approval to participate in the study prior to any data collection.
- 2) Implementation phase included also assessment of knowledge and nurses' practice regarding care of patient with implanted port catheter undergoing chemotherapy by using self-administered questionnaire sheet and observational checklist (pretest) before developing self-learning package.
- 3) Data collection was done 3 days/week by the researcher in morning and afternoon shifts. (Saturday, Monday and Thursday) in the morning shift from 9:00 AM and extended to 1: 00 PM and in the afternoon shift from 4 PM to 7 PM.
- 4) Based on data collection, nurses' needs were determined and the researcher developed the self-learning package.

- 5) Self-learning package composed of two parts; theoretical part and practical part **theoretical content** covering the introduction, cancer, diagnosis of cancer, risk factors, complications, diagnosis, cancer treatment, prevention of cancer chemotherapy, implanted port catheter, advantages of port catheter, disadvantages of port catheter, safety measures before and after port catheter insertion and infection control measures regarding care of patient with implanted port catheter undergoing chemotherapy.
- 6) **Practical part** covered nurses' performance such as hand washing, wearing PPE, caring for implanted port catheter and infection control measures.
- 7) The package was presented in concise and clear form and focused on point of learning and booklet developed and distributed to all nurses.
- 8) The package was tested for its content validity by 7 jury expertise.
- 9) Data collection was done before delivering the self-learning package (pre-test) and the second time immediately after self-learning package (post-test) and 3 months after delivering and studying the self-learning package (follow-up test).

D- The evaluation phase:

This phase included evaluating the effect of self-learning package on the nurses' knowledge and practice by comparing the results pre, post and follow-up self-learning package implementation by using the same data collection tools and it was done twice:

- Immediately after completion of self-learning package.
- After three months from the first evaluation.

It was done by using post-test questionnaire for knowledge and the observational checklist for practice assessment.

III-Administrative design:

An approval to carry out this study was obtained from director of oncology department in El-Demerdash Hospital affiliated to Ain Shams University. An Issued litter from the Dean of Faculty of Nursing at Ain-Shams University and official permission was obtained.

IV-Ethical consideration:

The research approval was obtained from the Scientific Research Ethical Committee Ain shams university faculty of nursing before starting the study, oral consent was obtained from the nurses under study after clarifying the aim of the study to them. The researcher assured maintaining anonymity and confidentiality of the study subject/data in addition nurses were informed that participation is voluntary.

V- Statistical design:

The data obtained was synthesized, analyzed, and presented in numbers, percentage, in the form of tables and figures. Recorded data were analyzed using the Statistical Package for Social Sciences (SPSS), version (20.0). Quantitative data were expressed as mean and standard deviation (SD). Qualitative data were expressed as frequency and percentage. Chi-square (X²) test was used when comparing between related samples. P-value <0.05 was considered significant, P ≤0.001 was considered as highly significant and P value >0.05 was considered insignificant.

RESULTS

Table (1): Shows that, 43.3 % of the studied nurses were aged between 20–30 years with mean age 28.7±12.032 years old, 70.0 % of them were females and 63.3 % of them had technical nursing institute education. Regarding years of experience, 46.7% of them had > 10 years with mean 11.033±7.954 years whenever 56.7% of them didn't have training course about port even moreover, 61.5% of nurses who had training courses didn't have any benefit.

As regards the total level of nurses' knowledge about all aspects of implanted port **Table (10)** shows that, there is marked improvement in nurses' knowledge parts about care of patients with implanted port catheter undergoing chemotherapy at pre, post and follow-up self-learning package with statistically significant difference ($P \leq 0.05^*$) except for methods of giving chemotherapy, there was statistically significant difference ($p < 0.001^{**}$). As evidence, (53.3 % & 56.7%) of the studied nurses had unsatisfactory knowledge regarding chemotherapy & implanted port catheter parts at pre- self-learning package compared to 83.3% of them had satisfactory knowledge at post self-learning package and also 80.0% of them had satisfactory knowledge at follow-up self-learning package implementation respectively.

Regarding the total level of nurses' practice on all aspects of implanted port **table (17)** illustrates that, there is marked improvement in nurses' practices parts about care of patients with implanted port catheter undergoing chemotherapy at pre, post and follow-up self-learning package with statistically significant difference ($P \leq 0.05^*$) except for Dressing of implanted port catheter, there was statistically significant difference ($p < 0.001^{**}$). As evidence, (56.7 % & 53.3%) of the studied nurses had unsatisfactory practices regarding Recapping of implanted port catheter & Dressing of implanted port catheter parts at pre- self-learning package compared to (86.7% & 83.3%) of them had satisfactory practices at post self-learning package and also (83.0% & 70.0%) of them had satisfactory practices at follow-up self-learning package implementation respectively.

Table (20) reveals that, there was highly statistically significant difference between total nurses' knowledge and their total practices at pre, post and follow-up self-learning package implementation.

Table (1): Distribution of the studied nurses regarding to their socio-demographic data (n=30).

Socio-demographic data	No.	%
Age/ years		
20<30	13	43.3
30<40	3	10.0
40<50	5	16.7
>50	9	30.0
Mean ±SD	28.7±12.032	
Gender		
Male	9	30.0
Female	21	70.0
Nursing qualification		
Nursing Diploma	6	20.0
Technical health institute	19	63.3
Nursing Bachelor	5	16.7
Nursing Master/Doctorate		
Experience years		
<3	8	26.7
3<5	5	16.7
5-10	3	10.0

>10	14	46.7
Mean ±SD	11.033±7.954	
Training courses		
Yes	13	43.3
No	17	56.7
Benefits (n=13)		
Yes	5	38.5
No	8	61.5

Table (10): Percentage distribution of the studied nurses regarding their total knowledge's parts about care of patients with implanted port catheter undergoing chemotherapy pre, post and follow up self-learning package (n=30).

Items	Pre				Post				Follow up				X2(1) p-value	X2(2) p-value
	Satis- factory		Unsatis- factory		Satis- factory		Unsatis- factory		Satis- factory		Unsatis- factory			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Cancer	19	63.3	11	36.7	27	90.0	3	10.0	25	83.3	5	16.7	5.758 0.041*	10.364 0.003*
Chemotherapy	14	46.7	16	53.3	25	83.3	5	16.7	24	80.0	6	20.0	5.250 0.031*	6.563 0.013*
Methods of giving chemotherapy	17	56.7	13	43.3	24	80.0	6	20.0	23	76.7	7	23.3	9.808 0.001**	11.940 0.001**
Implanted port-catheter	13	43.3	17	56.7	25	83.3	5	16.7	24	80.0	6	20.0	4.588 0.043*	5.735 0.021*
Caring for implanted port- catheter before implantation	16	53.3	14	46.7	27	90.0	3	10.0	25	83.3	5	16.7	5.685 0.026*	6.857 0.014*
Caring for implanted port- catheter post implantation	15	50.0	15	50.0	24	80.0	6	20.0	23	76.7	7	23.3	7.500 0.008*	9.130 0.003*
Complications of implanted port catheter	15	50.0	15	50.0	26	86.7	4	13.3	24	80.0	6	20.0	6.163 0.013*	7.500 0.008*
Infection control measures	19	63.3	11	36.7	27	90.0	3	10.0	26	86.7	4	13.3	5.758 0.041*	7.972 0.012*

* * Highly statistically significance $p \leq 0.001$ x2(1) Relation between pre & post self-learning x2 (2) Relation between pre & follow up self-learning

Table (17): Percentage distribution of the studied nurses' total practices' parts regarding caring for patients with implanted port catheter undergoing chemotherapy pre, post and follow up self-learning package (n=30).

Items	Pre				Post				Follow up				X2 (1) p-value	X2 (2) p-value
	Satis- factory		Unsatis- factory		Satis- factory		Unsatis- factory		Satis- factory		Unsatis- factory			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Flushing of implanted port catheter	18	60.0	12	40.0	26	86.7	4	13.3	25	83.3	5	16.7	6.923 0.018*	9.000 0.006*
Recapping of implanted port catheter	17	56.7	13	43.3	26	86.7	4	13.3	25	83.3	5	16.7	6.036 0.026*	7.846 0.009*

Dressing of implanted port catheter	16	53.3	14	46.7	22	73.3	8	26.7	21	70.0	9	30.0	12.468 0.001**	14.694 0.000**
Preparation chemotherapy of implanted port catheter	18	60.0	12	40.0	26	86.7	4	13.3	25	83.3	5	16.7	6.923 0.018*	9.000 0.006*
Administration of chemotherapy of implanted port catheter	20	66.7	10	33.3	26	86.7	4	13.3	25	83.3	5	16.7	9.231 0.008*	12.000 0.002*
Infection control of implanted port catheter	19	63.3	11	36.7	27	90.0	3	10.0	26	86.7	4	13.3	5.758 0.041*	7.972 0.0012*

* * Highly statistically significance $p \leq 0.001$ χ^2 (1)= Relation between pre& post program. χ^2 (2)= Relation between pre& follow up program.

Table (20): Correlation between total knowledge and practices regarding caring for patients with implanted port catheter undergoing chemotherapy pre, post and follow self-learning package (n=30)..

Scale	Total practices			
		pre-program	post-program	Follow- program
Total knowledge	r	0.874	0.850	0.745
	p- value	0.000**	0.000**	0.000**

* * Highly statistically significance $p \leq 0.001$ **

DISCUSSION

Hooda & et al., 2020 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.

Gallieni & et al., 2020 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.

Regarding the **socio-demographic** data of the studied nurses, the study revealed that, less than half of the studied nurses were aged between twenty to thirty years with mean age 28.7 ± 12.032 years old, more than two thirds of them were females and nearly two thirds of them had technical nursing institute education. As regards the years of experience, the study showed that less than half of them had more than ten years of experience and more than half of nurses didn't have training courses about the port A-Catheter.

This result is not in line with to **Mersal, N., Sofar, S., & Elnakshabandy, E., 2022**, who mentioned on a research study entitled; “Effect of Educational Guidelines on Nurses' Performance regarding Prevention of Port-A- Catheter complications among Patients Undergoing Chemotherapy”, they reported that the mean age of the studied nurses was Mean \pm SD 32.7 ± 4.5 . While near three quarter of nurses had not received training courses or lectures regarding pot-A-catheter. And more than three quarters of nurses had nursing diploma and less than one quarter with years of experience. From the researchers' point of view, this might explain that most of those nurses were fresh graduated. So, they did not have more years of experience in the care of patients with Port a Catheter.

As regards the nurses' total knowledge's parts about care of patients with implanted port catheter undergoing chemotherapy pre, post and follow up self-learning package. The study revealed that, there was highly improvement in nurses' knowledge parts about care of patients with implanted port catheter undergoing chemotherapy at pre, post and follow-up self-learning package with statistically significant difference ($P \leq 0.05^*$) and regarding the methods of giving chemotherapy, there was statistically significant difference ($p < 0.001^{**}$). As evidence, nearly half of the studied nurses had unsatisfactory knowledge regarding chemotherapy & implanted port catheter parts at pre-self-learning package while more than three quarters of them had satisfactory knowledge at post self-learning package and at follow-up self-learning package implementation.

This is related to **Atia (2021)**, in study "Effect of Instructional Module about Central Venous Catheter on Nurse's Performance and Patients Outcomes", who reported that structured education was best effective on improving knowledge of nurses regarding venous access catheter care. And the present finding consistent with **Ciou and Chuang, 2021** who reported that less than half of the nurses lacked knowledge regarding port -A- catheter pre-educational training and the satisfactory rate of port nursing knowledge raised from about one third to more than three quarters post educational training, indicating true improvement in knowledge of port -A-catheter for nursing staff.

In relation to the nurses' total practices' parts regarding caring for patients with implanted port catheter undergoing chemotherapy pre, post and follow up self-learning package. The study explained that, there was highly improvement in nurses' practices parts about care of patients with implanted port catheter undergoing chemotherapy at pre, post and follow-up self-learning package with statistically significant difference ($P \leq 0.05^*$) except for dressing of implanted port catheter, there was statistically significant difference ($p < 0.001^{**}$), which evidenced as, less than two thirds of the studied nurses had unsatisfactory practices regarding Recapping of implanted port catheter & dressing of implanted port catheter parts at pre-self-learning package while the most of them had satisfactory practices at post self-learning package and at follow-up self-learning package implementation respectively.

This is congruent with **to Mersal, N and et al., 2022**, who mentioned on a research study entitled; "Effect of Educational Guidelines on Nurses' Performance regarding Prevention of Port-A- Catheter complications among Patients Undergoing Chemotherapy". Who revealed that more than half of the studied nurses had adequate total practice pre-educational guidelines while, majority of them had adequate total practice post educational guidelines with highly statistically significant difference between pre- and post-educational guidelines implantation. This finding declared that implementation of the educational guidelines was an effective intervention that improved nurse's knowledge, which in turn improved their practice.

From the researcher point of view, the improvement of nursing skills or practices depends mainly on the guidance, training, and follow up their practices through learning program or workshop and it is vital role of health agencies to provide that for its nursing staff.

Regarding the correlation between total knowledge and practices regarding caring for patients with implanted port catheter undergoing chemotherapy pre, post and follow self-learning package. The study revealed that there was a highly statistically significant difference between total nurses' knowledge and their total practices at pre, post and follow-up self-learning package implementation.

This finding is correlated with **Nassim et al., 2022** on the research entitled "Nurses' Knowledge About the Safe Administration of Chemotherapy in The Oncology Center at Tishreen University Hospital in Lattakia" Who indicated that there is an effective relation between nurses' knowledge and practice as usually the efficient nurses' knowledge about uses the safety and protective measures in their

practices has positive affect on cancer patients' response to treatment process. The studies report and research focus on revealing the gap between the nurses' knowledge and their actual competency with respect to the use of protective measures. The researcher's point of view shows that there is an effective relation between nurses' practice based on experiences and their `acquired knowledge form education and learning guidelines.

CONCLUSION

Based on the results of the present study, it can be concluded that, implementation of self- learning package had highly statistical positive effect on improving nurses' knowledge and practice scores to attain research hypothesis. While there was statistically significant relation between educational level, years of experience, training courses regarding total knowledge, and practice scores at pre, post and follow-up implementation of self-learning package As there was statistically significant improvement throughout three phase (pre/post and follow-up) of self –learning package.

RECOMMENDATIONS

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

- The importance of conduction the SLP in a wider field including all hospitals to raise the efficiency of nursing care provided.
- Continuous training program should be organized for nurse's care on patient with implanted port catheter undergoing chemotherapy for continuous updating nurses` knowledge, enhance their performance, and consequently improve outcome of care
- Establish in-service training programs about care of patient with implanted port catheter undergoing chemotherapy and improve their practice to gain positive attitude.
- Oncology unit in hospital should be supplied with Arabic SLP for improving nurses' performance for caring cancer patients.
- Hospitals must expand protocols and rules to inform nurses how to learn and acquire skills regarding care of patient with implanted port catheter undergoing chemotherapy.
- A further study to be carried out in different settings on a larger sample for a wider utilization of the SLP, in order to achieve generalization of the results.

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