

Effect of specialty training on nursing staff's KAP on PICC and catheter maintenance.

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Abstract

Objective: To explore the effect of specialty training on nurses' knowledge, attitude, and practice (KAP) on peripherally inserted central catheter (PICC) and catheter maintenance.

Methods: 100 nurses were involved in specialty training, and the cases they cared before and after the training were collected to analyse the safety and availability of catheter maintenance through comparing the patients' comfort level on it.

Results: Through statistical analysis on questionnaires, it was known that after specialty training, the scores of knowledge, attitude, and behaviour on PICC catheterization of the experimental group were much higher than that of the control group, and the difference was significant ($P<0.05$); compared the knowledge, attitude, and practice on PICC of nurses from various departments, there was statistical difference ($P<0.05$); there was statistical difference in the knowledge, attitude, and practice on PICC of nurses with different educational backgrounds after training ($P<0.05$), and the better the educational background was, the better the effect of specialty training was; compared the correlation of knowledge, attitude, and practice on PICC catheterization, the knowledge was mildly correlated with the attitude as well as practice ($r=0.243$, $P<0.05$; $r=0.331$, $P<0.05$), while the attitude was moderately related to the practice ($r=0.594$, $P<0.001$), which suggested that if the nurses had more knowledge about PICC catheterization, their attitude would be better, and if they had better attitude about it, they would be more active in learning, resulting in a better effect of PICC specialty training; the success rate of catheterization of the experimental group was 83.75%, much higher than 67.50% of the control group, with a statistical difference ($P<0.05$). The incidence of complications of the experimental group was 15.00%, much lower than 36.25% of the control group, whose difference was significant ($P<0.05$); the degree of comfort of the experimental group was 75.00%, much higher than 67.50% of the control group, with a statistical difference ($P<0.05$).

Conclusion: After specialty training, the nurses have got great improvement in knowledge, attitude, and practice on PICC, further promoting the nursing level and clinical application of PICC.

Keywords: Peripherally inserted central catheter, Specialty, Knowledge-attitude-practice.

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Introduction

According to the data of WHO, there are more than 1 million new cancer patients per year in the world, and chemotherapy has been the main method for the treatment of cancer [1]. As chemotherapy drugs themselves have a certain irritation, the traditional intravenous infusion therapy has been unsuitable for the current chemotherapy infusion [2]. Therefore, peripherally inserted central catheter (PICC) has been commonly used for the transfusion of these drugs with high irritation and corrosivity. PICC, a puncture method that directly transports drugs into the body through peripheral veins with high capacity and speed, has advantages like small wound and high success rate, without the limitation of age, sex, and disorder types [3-5]. Consequently, it has been widely used. A survey [6] shows that specialty training can improve the awareness and approval of clinical nurses on knowledge, attitude, and practice

(KAP) of PICC catheterization, to promote the application of PICC in clinic. Therefore, this study implements a specialty training program for nurses to improve their nursing quality of PICC, to provide references and guidance for follow-up PICC specialty training.

Data and Methods

General data

100 female nurses of various departments from two tertiary hospitals were enrolled in the study, aged from 25-65 years, (35.3 ± 4.8) years in average.

Inclusion criteria: those who had a college degree or above; those who had a title of primary nurse or above; those who had worked for three years or more and passed the examination of

nursing skills held in their hospital; those who had performed independently PICC catheterization or maintenance for ten cases at least. 80 cases who were given catheterizations by these nurses after PICC specialty training were assigned into the experimental group, 56 males, 24 females, aged from 28 to 66 years, with a mean age of (48.56 ± 4.55). Another 80 cases who were given catheterizations by these nurses before PICC specialty training were assigned into the control group, 58 males, 22 females, aged from 27 to 65 years, with a mean age of (47.65 ± 4.45). All patients or their families and the nurses signed the informed consent approved by the medical ethics committee of the hospital.

Methods

The 100 nurses enrolled in the study were given specialty training which was the concern of a German professional training company and 10 nurses of the two hospitals who participated in the PICC training launched by Chinese Nursing Association (CNA) and passed the exam of qualification certification, to get the best result of training in the shortest time. The concrete methods were as follow: combining with the advanced experience at home and abroad, as a day release one for 28 days, the specialty training was conducted though multimedia teaching, nursing round, group discussion, and case study. On the basis of Chinese Nursing Association PICC Techniques and Guidelines and Principles of Nursing Practice on Transfusion, it was divided into theory teaching and clinical practice, and the theory teaching focused on the origin, development and the newest research progresses of PICC catheterization, features and assessment of human blood vessels, contraindications of special drugs, PICC supplies, standardizations of catheter practice and maintenance, the management flow of relative complications, and so forth. While the clinical practice included such manipulations as check-up doctor's order, complete and accurate assessment on the patient, preoperative preparations, and implementing

puncture and catheterization. During their manipulation over models, the nurses were provided guidance on their deficiencies by the supervisors and to be assessed after they mastered the norm of manipulation. The 100-nursing staff were investigated by a unified questionnaire before and after training, to inspect their familiarity on PICC catheterization and KIP.

Evaluation criteria

KAP on PICC catheterization of the nurses were graded and scored and KAP of the nursing staff with various educational backgrounds from different departments after training were statistically compared. What's more, the success rate of PICC catheterization and the incidence of complications were graded and the degree of comfort of patients on PICC catheterization was compared before and after training.

Statistical analysis

All data were analysed by software SPSS17.0, and the measurement data were expressed by ($\bar{x} \pm s$) and analysed by t test. Person correlation analysis was used for the comparison on KAP of the nurses after training. And the success rate, incidence of complications and degree of comfort were compared by χ^2 . P<0.05 was defined as statistical difference.

Results

Grading of KAP on PICC of the nurses before and after training

According to the statistical analysis, it was known that the score of KAP on PICC catheterization of the experimental group was much higher than that of the control group, with a statistical difference (P<0.05) (Table 1).

Table 1. Grading of KAP on PICC of the nurses before and after training (n=100).

Group	Knowledge (%)			Attitude (%)			Practice (%)		
	Excellent	Good	Bad	Positive	Neutral	Negative	Positive	Neutral	Negative
Experimental group	28 (28.00)*	60 (60.00)	12 (12.00)	89 (89.00)*	9 (9.00)	2 (2.00)	68 (68.00)*	22 (22.00)	10 (10.00)
Control group	18 (18.00)	54 (54.00)	28 (28.00)	76 (76.00)	14 (14.00)	10 (10.00)	55 (55.00)	35 (35.00)	10 (10.00)

Note: compared with the control group, *P<0.05.

Comparison on KAP on PICC of the nurses from various departments after training

After training, compared the KAP on PICC of the nurses from various departments, there was difference, mainly reflecting in that the nursing staff from the department of oncology had the best training effect, and after comparison, the difference was statistically significant (P<0.05) (Table 2).

Table 2. Comparison on KAP on PICC of the nurses from various departments after training ($\bar{x} \pm s$).

Group	Amount	Knowledge	Attitude	Practice
Internal department	20	81.33 ± 6.98	92.49 ± 7.07	70.33 ± 8.02
Surgical department	28	83.23 ± 7.18	93.56 ± 7.85	72.56 ± 8.65
Paediatrics	12	84.26 ± 6.36	98.94 ± 7.46	78.38 ± 8.16
Department of oncology	of 40	89.34 ± 6.17*	99.44 ± 7.87*	79.39 ± 8.98*

Note: compared with the control group, *P<0.05.

Comparison on KAP on PICC of the nurses with various educational background after training

After comparison, it was known that there was statistical difference in KAP on PICC of the nurses with various educational background after training ($P<0.05$), and the better their educational background were, the better effect of training they had (Table 3).

Table 3. Comparison on KAP on PICC of the nurses with various educational background after training ($\bar{x} \pm s$).

Group	Amount	Knowledge	Attitude	Practice
College degree	58	82.03 ± 6.09	92.38 ± 7.03	72.08 ± 5.93
University Bachelor degree	32	87.25 ± 6.54	97.32 ± 7.32	73.22 ± 5.57
Master degree or above	10	89.65 ± 6.99*	98.76 ± 7.78*	76.67 ± 5.96*

Note: compared with the control group, *P<0.05.

Correlation analysis on KAP of PICC

After specialty training, the nurses had improvement in KAP on PICC, and compared the correlation among knowledge, attitude, and practice on PICC catheterization, the knowledge was mildly and positively related to the attitude and practice ($r=0.243$, $P<0.05$; $r=0.331$, $P<0.05$), while the attitude was moderately and positively associated with the practice ($r=0.594$, $P<0.001$), suggesting that the more knowledge they mastered, the better their positive attitude was, and the better their attitude was, the stronger their active learning ability and behaviours were, consequently, the effect of training about PICC was better.

Comparison on the success rate of catheterization and the incidence of complications of two groups

Compared on the success rate of catheterization and the incidence of complications of two groups before and after training, the success rate of the experimental was 83.75%, much higher than 67.50% of the control group, with a statistical difference ($P<0.05$). The incidence of complications of the experimental group was 15.00%, much less than 36.25% of the control group, with a statistical difference ($P<0.05$) (Table 4).

Table 4. Comparison on the success rate of catheterization and the incidence of complications before and after training (n, %).

Group	Amount	Success rate	Incidence of complications
Experimental group	80	67 (83.75%)	12 (15.00%)
Control group	80	54 (67.5%)	29 (36.25%)

Note: compared with the control group, *P<0.05.

Comparison on the comfort level about catheter maintenance of two groups

With comparison, it was known that the comfort level of the experimental group was 75.00%, much higher than 67.50% of the control group, and the difference was significant ($P<0.05$) (Table 5).

Table 5. Comparison on the comfort level about catheter maintenance of two groups (n, %).

Group	Amount	Grading on the comfort level		
		Comfortable	Plain	Uncomfortable
Experimental group	80	60 (75.00)	12 (15.00)	8 (10.00)
Control group	80	54 (67.50)	16 (20.00)	10 (12.50)

Note: compared with the control group, *P<0.05.

Discussion

Some investigations [7,8] reveal that there is a great imbalance in the development of medical care across China, and there is a big difference in the development and promotion of PICC techniques in various hospitals, which has impacted on the wide recognition of PICC to some extent. Specialty training for nurses has been used to promote the application of PICC in clinic in Beijing, Shanghai, Guangzhou and other places, successively. With the gradual maturity of PICC technology, other specialty training has also acquired more and more attention. According to the latest surveys at home and abroad [9-14], it is known that the specialty training for nurses can make them know well about the knowledge, attitude, and practice about PICC, and increase their nursing satisfaction in daily nursing care and patients' comfort level. In addition, it also can enhance nurses' professional attitude and spirit, compliance, and operational capability, and so do their overall mental outlook and mastery of skills [15-17].

In the study, the findings of questionnaire for the nurses suggest that the positive percentages in their knowledge, attitude, and practice on PICC before training are very low, which indicates that the nurses are unfamiliar with the knowledge of PICC and have some issues in professional attitude and practical ability before training. After training, their knowledge, attitude, and practice have been greatly improved, showing that the specialty training is able to deepen their understanding on the physical structure of human blood vessels, normalize their manipulation, and make them have a new experience in PICC catheterization. In this way, the nurses will be more active in using PICC catheterization and promoting its development in clinic, providing a solid backup force for the follow-up work.

After training, the success rate of PICC catheterization of the nurses is up to 83.75% from 67.50%, and the incidence of

complication is down to 15.00% from 36.25%, and the comfort level of the patients has raised to 75.00% from 67.50%. That demonstrates that the specialty training can increase the success rate of PICC catheterization, decrease the incidence of complications, and improve the comfort level of the patients. Therefore, the patients can be more comfortable, safer, and more satisfied during catheter maintenance, and the nursing service can be smoothly conducted. In turn, the nurses are encouraged to provide better nursing services.

References

1. O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, Lipsett PA, Masur H, Mermel LA, Pearson ML, Raad II, Randolph AG, Rupp ME, Saint S. Guidelines for the prevention of intravascular catheter-related infections. *Clin Infect Dis* 2011; 52: e162-e193.
2. Rosenthal VD, Maki DG, Jamulitrat S, Medeiros EA, Todi SK, Gomez DY, Leblebicioglu H, Abu Khader I, Miranda Novales MG, Berba R, Ramirez Wong FM, Barkat A, Pino OR, Dueñas L, Mitrev Z, Bijie H, Gurskis V, Kanj SS, Mapp T, Hidalgo RF, Ben Jaballah N, Raka L, Gikas A, Ahmed A, Thu le TA, Guzmán Siritt ME; INICC Members. International Nosocomial Infection Control Consortium (INICC) report, data summary for 2003-22008, issued June 2009. *Am J Infect Control* 2010; 38: 952104.
3. Warrn DK, Yokoe DS, Climo MW, Herwaldt LA, Noskin GA, Zuccotti G, Tokars JI, Perl TM, Fraser VJ. Preventing catheter-associated bloodstream infections: a survey of policies for insertion and care of central venous catheters from hospitals in the prevention epicenter program. *Infect Control Hosp Epidemiol* 2010; 27: 8-13.
4. Pronovost P, Needham D, Berenholtz S, Sinopoli D, Chu H, Cosgrove S, Sexton B, Hyzy R, Welsh R, Roth G, Bander J, Kepros J, Goeschel C. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med* 2010; 36: 2725-2732.
5. Bibi S, Shah SA, Qureshi S, Siddiqui TR, Soomro IA, Ahmed W, Alam SE. Is chlorhexidine-gluconate superior than Povidone-Iodine in preventing surgical site infections? A multicenter study. *J Pak Med Assoc* 2015; 65: 1197-1201.
6. Turcotte S, Dubé S, Beauchamp G. Peripherally Inserted Central Venous Catheters Are Not Superior to Central Venous Catheters in the Acute Care of Surgical Patients on the Ward. *World J Surge* 2006; 30: 1605-1619.
7. Adan F. Observation on patients complicating with mechanical phlebitis after accepting insertion of PICC in different locations. *Chin Nurs Res* 2010; 24: 1246.
8. Su X, Xia JQ, Ren XH. Implementing grading management on PICC program. *Chin Nurs Manag* 2014; 14: 715-717.
9. Tran HS, Burrows BJ, Zang WA, Han DC. Brachial Artery venous Fistula as: A Case Report and Review of the Literature. *Am Surg* 2006; 72: 833-836.
10. Schmitt MB, Titler MG, Herr KA, Ardery G. Challenges of Web-based education in educating nurses about Evidence-based acute pain management practices for older adults. *J Contin Educ Nurs* 2012; 35: 121.
11. Nash RE. Good practice report: clinical teaching. Australian Learning & Teaching Council 2012.
12. Xing L, Adhikari VP, Kong L. Diagnosis and treatment of peripherally inserted central catheters (PICC)-related sepsis in breast cancer patients carrying PICC catheter for chemotherapy. *Chin Germ J Clin Oncol* 2012; 11: 99-103.
13. Ren DQ. Establishment and management of PICC nursing clinic. *Chin Nurs Manag* 2013; 13: 141-142.
14. Oakley C, Wright E, Ream E. The experiences of patients and nurse with a nurse-led peripherally inserted central venous catheter line service. *Eur J Oncol Nurs* 2013; 4: 207-218.
15. Wei H, Zhao QH. Analysis of the current situation and its influencing factors of the knowledge-attitude-practice on catheter maintenance in discharged patients with PICC. *Chin Nurs Manag* 2014; 14: 472-475.
16. Pittiruti M, Hamilton H, Biffi R, MacFie J, Pertkiewicz M; ESPEN. ESPEN Guidelines on Parenteral Nutrition: central venous catheters (access, care, diagnosis and therapy of complications). *Clin Nutr* 2009; 28: 365-377.
17. Safdar N, Jacobs EA, Gaines EA. Patient awareness of the risks of central venous catheters in the outpatient setting. *Am J Infect Control* 2012; 4: 87-89.

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