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The effect of a Groshong PICC continuing education program on home healthcare nurses

Mary Theresa Ames
Medical College of Ohio

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FINAL APPROVAL OF SCHOLARLY PROJECT
Master of Science in Nursing

The Effect of a Groshong PICC Continuing Education Program on Home Healthcare Nurses

Submitted by
Mary Ames

In partial fulfillment of the requirements for the degree of
Master of Science in Nursing

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Date of Presentation: April 19, 2005
The Effect of a Groshong PICC Continuing Education Program on Home Healthcare Nurses

Mary Theresa Ames

Medical College of Ohio

2005
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More than 50,000 people a year receive home infusion services (Center for Disease Control, 2004). The peripherally inserted central catheter (PICC) is frequently used for home infusion therapy. It is the home health nurse’s responsibility to care for and teach the patient to care for these central catheters.

A PICC is a central catheter placed peripherally, usually using veins of the antecubital fossa. PICCs are made of polyurethane or silicone material and can be single or double lumen (Hankins, Lonsway, Hedrick, & Perdue, 2001). There are many different brands of PICCs but two specific types. Open ended catheters include brands such as: Per Q Cath, L-cath and Cook Critical Care catheters. Open ended catheters require saline and heparin for maintenance. The Groshong PICC is a valved catheter manufactured by Bard Access Systems that requires only saline for maintenance.

Deane (2004) described how the use of specific venous access devices are an important step in successful intravenous therapy outcomes in the home. The PICC has multiple advantages. Most types of PICC insertions can be performed at hospital bedside or in the home. Because PICCs are inserted in the arm, there is a decreased risk of air embolism. Groshong PICCs, due to the valved end, have minimal risk of air embolism. PICC insertion is considered less traumatic than chest central catheter placements. PICC devices are associated with low infection rates and have less insertion related complications compared to other central catheters. PICC lines can be
left in place for extended periods of time (Deane, 2004) making them appropriate for home care therapies. The Groshong PICC requires only saline for maintenance adding to the convenience of use and cost effectiveness for homecare.

PICCs require highly skilled professionals for insertion and maintenance. The health care professional caring for a PICC has a significant impact on the success of these catheters and positive patient outcomes (Cardella, Cardella, Bacci, Fox, & Post, 1996; Funk, Gray, Pierre & Plourde, 2001; Miller & Dietrick, 1997). Nurses who are knowledgeable in the different types of PICCs, the specific care each catheter requires, plus receive ongoing education, can improve PICC longevity and reduce complication and failures (Cardella et al., 1996).

Statement of Problem

Home health nurses care for many different brands of PICCs. Not being knowledgeable in the different types of PICCs, open ended or valved, can compromise PICC longevity, lead to increase complications and have an effect on cost effectiveness.

Identification of Nursing Theoretical Framework

Neal’s theory of home health nursing practice was the nursing framework used for this study. Neal’s theory is specific to home health nursing practice. Neal defined the practice of home health nursing as a three stage process requiring the nurse to be adaptable (Neal, 1999; Neal, 2000). The Neal Theory of Home Health Nursing Practice is very similar to Benner’s (1982) novice to expert theory, with the addition of the adaptation component in Neal’s theory. Adaptation is what makes Neal’s theory appropriate for the home health nurse.
Neal’s theory consists of three stages: dependence, moderate dependence, and autonomy. In the dependence stage, the nurse is frightened and overwhelmed. The home health nurse in this stage lacks confidence, feels isolated and needs structure. Lack of creativity and difficulty adapting are characteristics of the dependence stage. The second stage is called moderately dependent. In this stage, the home health nurse is beginning to feel more comfortable, is developing confidence, is learning to be innovative, and learning to adapt. Autonomy is the third stage. Home health nurses in this stage are widely adaptable. Confidence, comfort, enjoyment in working independently, creativity, and innovation are characteristics of the nurse in the autonomy stage. Time, experience, and confidence in the role of a home health care nurse are subsequent factors affecting the nurse in reaching the third stage of autonomy (Neal, 1999; Neal, 2000).

A continuing education (CE) program focused on the Groshong PICC in homecare may aid the home care nurse in being able to identify the specific type and brand of PICC being used in the home. This added knowledge would assist the nurse in adapting and progressing toward the goal of autonomy. Increased knowledge regarding the Groshong PICC may result in improved therapy outcomes and improved cost effectiveness.

Statement of Purpose

The purpose of this scholarly project was to evaluate the effects of a continuing education program for home health care nurses based on the use and maintenance of the Groshong PICC in home health care.
Project Questions

1. Will a CE program on the Groshong PICC assist home health nurses in their ability to identify the type of catheter being used and maintenance procedures required in the home setting?

2. Will attendance at a CE program on Groshong PICC assist the nurse to adapt and progress toward autonomy consistent with Neal’s theory of home health nursing practice?

Definition of Terms

Peripherally inserted central catheter (PICC)

A PICC is a long, radiopaque, flexible catheter that is introduced into an antecubital vein with the distal tip terminating in the superior vena cava (Hankins, Lonsway, Hedrick, & Perdue, 2001).

Groshong PICC

A PICC consisting of soft, medical grade silicone rubber tubing with a closed, rounded tip. The closed, end has a patented three-position valve (or valves) to allow fluids to flow in or out but remains closed when not in use (Bard Access Systems, Inc., 2002).

Continuing Education

A systematic professional learning experience designed to augment the knowledge, skills, and attitudes of nurses and therefore enrich the nurses' contributions to quality health care and their pursuit of professional career goals (ANCC, 2002).
Adaptation

Conceptual definition: A gradual change in behavior.

Operational definition: An answer of “yes” on post education questionnaire that CE program assisted in adaptation toward autonomy.

Significance

The home care nurse responsible for the care of PICCs in the home has a significant impact on the success of these catheters (Cardella, et al., 1996; Funk, et al., 2001; Miller & Dietrick, 1997). Due to the fact that there are many different brands of PICCs and some require different maintenance, nurses need to be especially competent in caring for these lines in the home to assure safe and successful outcomes. Cardella et al. (1996) stated that nurses need aggressive and repetitive inservice training to increase PICC longevity, reduce complications and decrease failures.

Assumptions

Assumptions of this study were that the participants of the Groshong PICC educational program will complete the pre and post test honestly. It is also assumed that participants will have a basic understanding of home infusion therapy.

Limitations

This study utilized a convenience sample of nurses from a small, rural hospital based and a community health department home health agency, which limits generalizability of the results.
Summary

The continued growth of home infusion therapies (Center for Disease Control, 2000) requires the home health care nurse to maintain a high level of competence. PICC use in home health care continues to grow as well. Research is needed to examine if knowledge gained from an educational program on Groshong PICCs leads to increased ability to identify type of PICC being used in the home and increased adaptation, resulting in a more autonomous home health nurse within the framework of Neal’s theory of home health nursing practice.
The Groshong PICC is frequently used for home infusion therapies and home health care nurses need to be competent in care and maintenance procedures involved with these venous access devices. This chapter includes a discussion of the development of the present project conceptualized within Neal’s (2000) theory of home health nursing practice. Also included is a review of the literature related to the use of PICCs, safety in the home and role of the home health nurse in use of these catheters.

Theoretical Framework

Home health nursing is a specialty of nursing practice that requires a conceptual framework specific to this field. Home health nurses must be adaptable, knowledgeable, have excellent assessment and clinical skills, communicate effectively, work independently and be able to care for the patient in the patient’s home. In the home, patients are in their environment and the home health nurse is more like a guest as opposed to the hospital where the nurse has more control. Neal (1999, 2000) has developed a nursing theory that is specific to the home health care nurse. Neal’s (1999, 2000) theory of home health nursing practice consists of three stages the nurse must work through to reach autonomy. Passage of time and the subsequent increase in experience and confidence facilitate the nurse moving through the three stages to reach autonomy (Neal, 1999). The key to functioning successfully in home care is adaptation (Neal, 1999; Neal, 2000). The three stages of the Neal theory are as follows: dependence, moderate dependence, and autonomy.
Home care nurses experiencing dependence are frightened or overwhelmed by the logistical factors, the clinical aspects of practice, or both. Logistic aspects of homecare nursing practice include travel; weather conditions; paperwork; scheduling; negotiating with payer sources, physicians, and patients; acquiring supplies and resources; and working alone. Clinical aspects of home care pertain to issues surrounding the client’s care such as performing assessments and procedures, providing medication instruction, and supporting the caregivers (Neal, 1999). Nurses in the dependent stage need a lot of help with travel and paperwork, and they ask a lot of questions. Even experienced nurses, new to the home care setting, find themselves feeling dependent. It can take more than a year for a nurse new to home health care to become fully functional and efficient in providing care (Rea, 2002).

During the second stage of moderate dependence, the nurse begins to feel more comfortable with both the logistic and clinical issues of homecare. The nurse is still learning but is no longer frightened or overwhelmed. The moderately dependent nurse is beginning to feel less worried, asks fewer questions and is beginning to answer some questions for nurses. The nurse is beginning to understand home care reimbursement issues and is learning to negotiate with payors. Clinically, the moderately dependent nurse is starting to receive validation for clinical decisions (Neal, 1999).

Characteristics of being autonomous include confidence, assertiveness, expertise in problem solving and critical thinking. The nurse is confident and self-assured regarding all aspects of home health nursing. Nurses in this stage feel comfortable coordinating, directing, and managing patient care. These nurses
communicate effectively with physicians with whom they work and are comfortable negotiating with payer sources, physicians, and other health care providers like physical therapists, occupational therapists, social workers and home health aids (Neal, 1999).

Nurses may periodically revert to moderate dependence when faced with new clinical issues. As the nurse deals with the restricting factor(s) and once more moves on to feeling confident and self-assured in personal nursing practice, he or she again progresses to autonomy (Neal, 1999).

Home infusion nurses are a subspecialty within the home health care specialty. Home infusion nurses often come from acute care, intensive care, emergency room, oncology unit or hospital IV team backgrounds, but do not have home care experience. Home infusion therapy practice differs considerably from clinical practice within the acute setting (Prozialeck, 1999). Neal’s (1999, 2000) theory of home health nursing practice is a guide for practice based on how home health nurses define their practice. Nurses who either are not adaptable or cannot learn to adapt do not appear to proceed through the stages and learn to function effectively and successfully in home care (Neal, 1999).

Prozialeck (1999) cites quality assurance, high level patient outcomes, professional standards, staff retention, marketing edge and cost reduction, mandate on going education in the ever changing home health care environment. A continuing education program on Groshong PICC in home health care may allow the nurse to make adaptations allowing him or her to move toward autonomy. Figure 1 describes
the relationship between a Groshong PICC program and adaptation of the nurse, consistent with Neal's theory of home health nursing practice.

*Figure 1.* Adaptation of Neal's (1999) Theory of Home Health Nursing Practice and Groshong PICC Continuing Education Program
A Groshong PICC education program will facilitate adaptation in the home health nurse and lead to less dependence. As the home health nurse uses knowledge obtained from the program and gains experience, the nurse will reach the highest level in Neal’s theory of home health nurse practice, autonomy.

In summary, Neal’s (1999, 2000) theory of home health nursing practice formed the basis for this research study. The Groshong PICC program is the source of knowledge required by the nurse in the first step toward advancing to stage two or three. The autonomous nurse is confident and self assured and available to help other nurses reach a stage of less dependence.

Review of Research

PICC Use

No data was available, in the literature regarding number of PICCs placed in the home. Many PICCs are placed in the hospital with the intention of delivery of infusion therapy in the home (Ault, Ng, & Artal, 2001). Crawford, Soukup, Woods, & Deisch (2000) reported an average of 600 to 700 annual requests for PICC insertions at a Midwest tertiary care hospital. PICCs are requested due to poor peripheral access and for the administration of IV antibiotics, vasoactive therapy, heparin therapy, chemotherapy and TPN (Arrowsmith, 1999; Ault, et al., 2001; Crawford, et al., 2000; Fong, Holtzman, Bettmann, & Bettis, 2001).
**Groshong PICC vs. other central venous catheters**

Groshong PICCs have a longer length of service when compared with other open ended PICCs (Hinson & Blough, 1996; Hoffer, Borsa, Santulli, Bloch, & Fontaine, 1999). Hoffer et al. (1999) studied 365 PICCs, 182 open ended PICCs and 180 Groshong PICCs. Open ended catheters had a 50% increase in complications compared with the Groshong group. 26 occlusive or infectious complications occurred in the open ended catheter groups and 12 in the Groshong catheter group. The open ended and Groshong catheter group had 13 and 5 occlusions, respectively, and 12 and 5 catheter related blood stream infections, respectively. Statistically there is a significant difference in the complication rate for the Groshong PICC compared with the open ended PICC (Hoffer et al., 1999).

Hinson et al. (1996) studied 58 Groshong PICCs and compared outcomes with 58 open ended PICC outcomes. A decreased incidence of clotted catheter occlusions were found. Six percent of Groshong PICCs experienced occlusion compared with 94% open ended catheters \( X^2 (n=58, 1) = 15.51, p< .00 \). Other results in the Groshong group identified by Hinson & Blough (1996) include increased flow rates, improved radiographic visualization, and increased satisfaction from patients, physicians, and nurses.

**Infection rate**

Infection rates are low with both open ended and valved PICCs (Ault, et al. 2001; Fong, Holtzman, Bettmann, & Bettis, 2001; Funk, et al. 2001; Hoffer, et al. 1999; Horattas, Trupiano, Hopkins, Pasini, Martino, & Murty, 2001; Loewenthal, Dobson,
Starkey, Dagg, Petersen, & Boyle, 2002; Miller & Dietrick, 1997; Skiest, Abbott, & Keiser, 2000; Strahilevitz, Lossos, Verstandig, Sasson, Kori & Gillis, 2001). Miller and Dietrick (1997) had an infection rate of .26 per 1000 catheter days using the Groshong PICC and an open ended brand PICC. Funk, et al., (2001) study revealed infection rates of .5 – 1.6 per 1000 line days, however the specific type of PICC was not identified. Ault, et al. (2001) conducted a large study involving 5000 PICC insertions. Confirmed infections were reported as 0.4 per 1000 catheter days. Ault, et al. (2001) study used four different brands of PICC but did not specify if any were the Groshong, valved catheter. Loewenthal et al. (2002) looked at 209 Groshong catheters and found an infection rate of less than .23 infections per 1000 line days.

Patients with disease processes that increase their risk for infection have had successful IV therapy outcomes when using the PICC (Skiest, et al., 2000; Strahilevitz, et al. 2001). Skiest, et al. (2000) looked at 97 PICCs in the HIV population. The total infection rate was 1.3 per 1000 catheter days, and the serious infection (bacteremia) rate was .8 per 1000 catheter days. Strahilevitz, et al. (2001) looked at 40 patients with acute myeloid leukemia. An infection rate of 4.68 per 1000 catheter days was reported. Patients with leukemia are more susceptible than others to infections making results of this study favorable for use of PICCs (Strahilevitz, et al. 2001).

Cost Effectiveness

The valved Groshong PICC is cost effective (Hinson & Blough, 1996; Horrattas, et al., 2001; Miller & Dietrick, 1997). A quality that makes the PICC cost effective is that insertion and maintenance care can be performed by specially trained nurses rather
than by interventional radiologist or other physicians. PICC lines can be inserted at the hospital bedside or in the home. Cardella, et al. (1996) reported an 83% bedside insertion success rate. There were no studies evaluating the success of insertions in the home.

All PICCs in general are cost effective when compared to surgically placed central catheters (Horattas, et al., 2001). Groshong PICCs do not require heparin to maintain patency which is an additional cost savings and the patient is not exposed to adverse effects of heparin flushing.

The Groshong catheter and insertion kit initially are more expensive than the open ended PICC and insertion kit. However, in the long run, because of less maintenance, no need for heparin, longer dwell times and fewer complications the Groshong PICC can be justified as cost effective (Miller & Dietrick, 1997).

An important issue brought out by Griffiths and Philpot (2002), was that for successful outcomes, the insertion of the PICC needs to be introduced early in patient care. Patients who are subjected to multiple venapunctures for peripheral IVs or blood draws experience damaged venous status decreasing the success of PICC insertion, longevity and thus cost effectiveness (Griffiths & Philpot, 2002). The home care nurse can play a significant role by working with the physician in advocating for placement of a Groshong PICC in patients who are being poorly managed with peripheral venous access.

Fong, et al. (2001) compared insertion outcomes performed by a interventional radiologist and a registered nurse. PICCs were successfully placed in 99.1% of all
patients \((n=322)\). The rate of successful completion of therapy was 72.9\% \((n=140)\) for RNs compared to the interventional radiologist which was 68.3\% \((n=83)\). Actual cost was substantially different between the RNs and interventional radiologist, with the RN placement being lower. Crawford, Soukup, Woods, & Deisch (2000) report PICC placement by an RN can be between $300 and $500, whereas the estimated average cost can be three to four times higher when PICCs are placed in radiology.

**Home Health Nurse Knowledge and Competency**

Increased PICC insertion on admission to the hospital was seen in a study performed by Ault, et al. (2001) with the intent of completing therapy at home. The nurse taking care of these catheters has a significant impact of the success of PICC outcomes (Arrowsmith, 1999; Cardella, et al., 1996; Funk, et al., 2001; Miller & Dietrick, 1997).

Two studies were found that looked at clinical and educational preparation of home infusion nurses (MacPherson, 1999; Sexton & Seldomridge, 2002). McPherson (1999) found that 87\% of home care nurses thought nurses should have prior IV experience to work with home infusion patients, but only 60\% of nurses surveyed had prior IV experience before working in homecare. Sexton & Seldomridge (2002) did a partial replication study of MacPherson’s (1999) work. Sexton & Seldomridge (2002) found that 8\% of homecare nurses who considered themselves home infusion competent had never performed central venous catheter care.
The current home health environment requires staff to be organized, efficient, and cognizant of the complex regulations guiding patient care. The home health practice arena is markedly different from other practice settings, and nurses must learn new skills to be successful (Rea, 2002). Nurses require ongoing education and support to be successful in home care.

Because greater expertise is required in caring for any type of peripherally inserted central catheter, especially in the home, more research needs to be performed that looks at PICC outcomes in homecare along with nursing education and competency. Because there are many different brands of PICCs which require different types of maintenance, nurses need to be especially competent in caring for these lines in the home to assure safe and successful outcomes.

Researchers have documented in the literature that PICCs are safe, cost effective and associated with successful outcomes Cardella et al., 1996; Funk et al., 2001; Hoffer et al., 1999; Horattas et al., 2001; Miller & Dietrick, 1997). Knowing that the Groshong PICC has a higher success rate than open ended catheters makes it a good choice for the home infusion patient. Cardella et al. (1996) stated that nurses need aggressive and repetitive inservice training for PICC longevity, minimal complications and decreased failures. This is especially important for the homecare nurse providing infusion therapies in the home. Home care nurses need to be efficient and knowledgeable about the provision of quality patient care.
Summary

This chapter discussed Neal’s theory of home health nursing practice, which provides the theoretical support for this study. Neal’s theory is specific for home health nurses. Home care nurses proceed through three steps; dependency, moderate dependence, and the final step of autonomy. A continuing education program on Groshong PICCs in homecare may increase the knowledge and comfort level of home health nurses caring for these lines in the home. The home health nurse will be able to adapt and advance from dependence to moderate dependence or moderate dependence to autonomy.

The literature review looked at PICC use in homecare including, Groshong vs. other central lines, infection rate, cost effectiveness and home health nurse knowledge and competency. No studies were located which addressed PICC insertion in the home. One study performed a randomized comparison (Hoffer, et al. 1999); all other studies were retrospective or prospective studies using convenience samples. The studies reported that PICC use is safe and cost effective. While many PICCs and IV therapies are initiated in the hospital, many of these patients complete their IV therapy in the home.

The research is limited regarding homecare nurse competency caring for PICCs in the home. One study reported that nurses are indicating that they are home infusion nurses but not providing infusion services in their practices.
Chapter III
Method

The purpose of this scholarly project was to evaluate the effects of a continuing education (CE) program for home health care nurses on the use and maintenance of the Groshong PICC in home health setting. Neal’s (1999, 2000) theory of home health nursing practice was the nursing framework used for this study. An overview of the education program is discussed. The pre-test and post-test evaluation tool is described in this chapter. Subjects, materials, data collection and data analysis are also discussed as part of the evaluation of the program.

Design

A non-experimental, pre-test post-test design was used to evaluate the effectiveness of a continuing education program on Groshong PICCs in homecare and increasing the nurse’s ability to adapt and move toward autonomy. The nurse’s ability to recognize the Groshong PICC and differentiate how valved catheters differ from open ended catheters in care and maintenance was assessed. The program was presented by the advanced practice nurse (APN) to assist the home health nurse to adapt, become less dependent and ultimately to reach the stage of autonomy as described in Neal's (1999, 2000) theory of home health nursing practice. The effectiveness of the program was evaluated using a pre-test, post-test design.

The one hour program was presented at one rural, hospital-based home health agency and one rural, public health home health agency, to registered nurses who provide home infusion therapies. A pre-test was administered before the program and a post-test was administered immediately after the program.
Materials

A pilot study involving seven participants was conducted at one rural hospital based home health agency. The one hour power point presentation was developed using standards for infusion therapy developed by the Infusion Nurses Society, Groshong PICC product information from Bard Access Systems, and information from the Centers for Disease Control and Prevention (CDC) on infection control. The program was designed specifically for the home health care nurse regarding the Groshong PICC characteristics, care and maintenance.

For this study an application was submitted for approval of one continuing education hour. All registered nurses who participated in the program and completed a pre and post test received a certificate for one contact hour of continuing education.

The CE program (Appendix A) identified characteristics of the Groshong PICC and how the Groshong differs from open ended PICCs. The CE program described Groshong PICC maintenance procedures and how it differs from other types of central lines used in homecare. PICC complications and how to promote positive therapy outcomes were reviewed.

The pre-test was given before the one hour program (Appendix B). Subjects were asked to pick an identifying number to use on both the pre-test and post-test so that results could be compared. It was suggested that they use the last four digits of their phone number.

Information was obtained to assess the nurse’s knowledge of Groshong PICCs and how they differ from other types of PICCs. Two questions addressed comfort level
in providing home infusion therapies and comfort level with PICC lines specifically. A four point scale was used with one meaning least comfortable and four meaning most comfortable. Demographic information was obtained pertaining to number of years in nursing, number of years in homecare, and highest level of education. Two narrative questions were included pertaining to how the nurse was prepared to provide home infusion therapies and what nursing experience did the nurse have prior to working in homecare. The post test (Appendix C) included the same pre-test questions with the addition of a question regarding if the program facilitated adaptation and the nurse becoming less dependent, along with questions regarding if course objectives were met and effectiveness of presenter in order to meet criteria for awarding contact hours for continuing education.

Data Collection

Approval to perform the study was obtained from Medical College of Ohio Institutional Review Board (IRB) as expedited research. Permission from the department heads (Appendix D & E) at the two sites where the program was conducted was obtained.

Potential risk to the participants of this study may include anxiety if the nurse is unable to answer a question on the pre and post tests. Voluntary consent was explained on the cover letter given to subjects prior to program. Voluntary consent will be implied by attending the program and completing pre and post tests. There will be no penalty to the subject for not participating.
Registered nurses working at any of the two rural home health agencies where the Groshong PICC CE program was going to be presented were asked to participate and be the convenience sample. An advertisement was posted at each home health agency one month prior to the program explaining the type of program to be presented. One contact hour will be awarded for continuing education after completion of the entire program.

At the time of the presentation, participants were given a cover letter, approved by the institutional Review Board of the Medical College of Ohio, explaining the purpose of the program. Completion of pre and post tests indicated consent for participation in the study.

Prior to the presentation of the program, participants were asked to complete the pre-test and pick an identifier of the last four digits of their phone number and place it in the upper right hand corner of the pre-test. This was done to ensure confidentiality and anonymity of each participant in the study. Participants were instructed not to sign their name anywhere on the material given to them. The one hour program was then presented. Immediately after the program the post-test and program evaluation was passed out and participants asked to place their four digit identifier in the upper right hand corner. Completion certificates awarding one contact hour were sent to the agencies after copies of the evaluations were submitted.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data obtained in this study. Descriptive statistics were applied to all of the demographic
variables and to the primary study variables. The results of the pre-test and post-test was analyzed by using the Wilcoxon test. The Wilcoxon test analyzes changes that occur in dichotomous variables using a 2 x 2 table. This nonparametric test is appropriate for pre-test / post-test designs in which the subjects serve as their own control and the data are nominal (Burns & Grove, 2001). An alpha level of 0.05 was considered significant.

It is assumed that there would be a significant difference between comfort level when caring for Groshong PICCs in the pre-test and comfort level in the post-test. It was thought that increasing knowledge on the Groshong PICC would lead to adaptation and increased comfort and independence of nurses when caring for Groshong PICCs in homecare.

Summary

To evaluate the effectiveness of the Groshong PICC education continuing education program a pre-test post-test design was used. Home health registered nurses working at any of the two sites where the program was presented were asked to participate. After collecting the pre-test and post-test data, an analysis using the Wilcoxon test was used to evaluate the effectiveness of the program. The program presented in the manner described will allow the nurse to adapt, become less dependent and ultimately become autonomous in home care nursing practice as explained in Neal’s (1999, 2000) theory of home healthcare nursing.
Introduction

A pre-test and a post-test was used to determine if attending the one hour continuing education program “Groshong PICC in Homecare” was effective in assisting home health nurses in their ability to identify the type of catheter being used and maintenance procedures required in the home setting. The post-test looked at whether the intervention assisted the nurse to adapt and progress toward autonomy consistent with Neal’s theory of home health nursing practice. This chapter discusses the sample and the effectiveness of the continuing education program.

Sample

Participants for this study were recruited from one rural, hospital-based home health agency and one rural, public health home health agency. A convenience sample of fourteen female registered nurses was chosen from the two home health agencies to participate in this study. The participants were registered nurses who provided infusion therapies in the home setting. Level of education data is presented in Table 1.
Table 1

*Highest level of education in the sample of home care nurses (n=14)*

<table>
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<th>Degree</th>
<th>N</th>
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<td>Diploma</td>
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<td>(35%)</td>
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<td>ADN</td>
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<td>(43%)</td>
</tr>
<tr>
<td>BSN</td>
<td>2</td>
<td>(14%)</td>
</tr>
<tr>
<td>MSN</td>
<td>1</td>
<td>(7%)</td>
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</table>

A majority of the nurses (n=11, 79%) were prepared at the associate degree or diploma level. Two nurses had a bachelor's degree in nursing and one nurse was master's prepared.

Number of years working in nursing and as a home care nurse is presented in the following table.

Table 2

*Years working in the sample of home care nurses (n=14)*

<table>
<thead>
<tr>
<th>Years as a nurse</th>
<th>N (%)</th>
<th>Years in home care</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 years</td>
<td>0</td>
<td>8 (57%)</td>
<td></td>
</tr>
<tr>
<td>10-15 years</td>
<td>5 (36%)</td>
<td>5 (36%)</td>
<td></td>
</tr>
<tr>
<td>16 – 20 years</td>
<td>3 (21%)</td>
<td>1 (7%)</td>
<td></td>
</tr>
<tr>
<td>21 – 30 years</td>
<td>4 (29%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 – 40 years</td>
<td>2 (14%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Number of years working in homecare ranged from one year to eighteen years.

Number of years as a practicing registered nurse ranged from 10 – 40 years. All of the participants had at least 10 years of nursing experience before working in home care but the majority of nurses in homecare had worked there less then 10 years (n=8, 57%).

Nursing experience prior to working in homecare came from a variety of areas as described in Table 3.

Table 3

*Past work experience in the sample of home care nurses (n=14)*

<table>
<thead>
<tr>
<th>Nursing experience</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentally challenged</td>
<td>1</td>
<td>7%</td>
</tr>
<tr>
<td>Physician office</td>
<td>1</td>
<td>7%</td>
</tr>
<tr>
<td>School Nurse</td>
<td>1</td>
<td>7%</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Outpatient/ambulatory</td>
<td>2</td>
<td>14%</td>
</tr>
<tr>
<td>Nursing home /SNF</td>
<td>3</td>
<td>21%</td>
</tr>
<tr>
<td>Oncology</td>
<td>3</td>
<td>21%</td>
</tr>
<tr>
<td>Critical Care</td>
<td>3</td>
<td>21%</td>
</tr>
<tr>
<td>Hospital med/surg</td>
<td>5</td>
<td>36%</td>
</tr>
<tr>
<td>Hospital</td>
<td>5</td>
<td>36%</td>
</tr>
</tbody>
</table>

Ninety-three percent (n= 13) of the nurses had some basic hospital / medical surgical, critical care experience before becoming homecare nurses. Nurses with oncology or
nursing home/ skilled nursing facility experience were 21% \((n=3)\), respectively. Employment as a school nurse, physician office, mentally challenged, and psychiatric all had a small percentage of seven percent \((n=1)\) each. Many participants had experience in several areas before working in home care.

The nurses in the sample were prepared to perform home infusion therapies by receiving formal education through hospital/agency orientation \((n=4, 29\%)\) and education by an infusion company \((n=5, 36\%)\). Several of these nurses participated in both orientation and infusion company inservices. Forty-three percent \((n=6)\) of the participants received on the job training. Additional areas cited by the participants as ways that they prepared to perform home infusion therapies included past experience, inservices and other nurses. One nurse stated that she had not been prepared.

**Findings**

A pre test followed by a one hour continuing education program was presented and the post-test given to evaluate the increase in the home care nurse’s knowledge and comfort level regarding Groshong PICCs in the home. Refer to Appendix B & C for a copy of the pre-test and post test. It was an assumption of this study that an increase in knowledge and comfort level meant that the continuing education program was effective.

**Research Question 1**

The first research question examined by the study was: “Will a continuing education program on the Groshong PICC assist home health nurses in their ability to identify the type of catheter being used and maintenance procedures required in the
home setting?" Responses from the pretest and posttest were recorded for each subject. The pretest and post test asked two questions to examine the first research question: describe how a Groshong PICC differs from other PICC lines and what catheter maintenance is required for a Groshong PICC. Results were scored according to how detailed the answers were. The nurses who were able to cite 3 characteristics were considered knowledgeable, citing 2 characteristics meant somewhat knowledgeable, and 1 or no characteristics meant they were not knowledgeable. A Wilcoxon test was conducted to evaluate whether a continuing education program on the Groshong PICC assists home health nurses in their ability to identify the type of catheter being used and maintenance procedures required in the home setting. Pre and post test findings are presented in Table 4.

Table 4

Knowledge differences between the pre test and post test responses

<table>
<thead>
<tr>
<th></th>
<th>Not Knowledgeable</th>
<th>Somewhat Knowledgeable</th>
<th>Very Knowledgeable</th>
<th>Wilcoxon test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>p value</td>
</tr>
<tr>
<td>How Groshong PICC differs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>4 (29%)</td>
<td>8 (57%)</td>
<td>2 (14%)</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>0</td>
<td>4 (29%)</td>
<td>10 (71%)</td>
<td>.01*</td>
</tr>
<tr>
<td>Groshong PICC maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>4 (29%)</td>
<td>8 (57%)</td>
<td>2 (14%)</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>0</td>
<td>4 (29%)</td>
<td>10 (71%)</td>
<td>.01*</td>
</tr>
</tbody>
</table>
The results indicated a significant improvement after the educational program in ability to describe a Groshong PICC ($z = -2.65$, $p = .01$) and in ability to describe maintenance required for a Groshong PICC ($z = -2.76$, $p = .01$).

**Research Question 2**

The second research question examined by the study was, “Will attendance at a CE program on Groshong PICC assist the nurse to adapt and progress toward autonomy consistent with Neal’s theory of home health nursing practice?” The pre-test and post-test asked about comfort level in providing home infusion therapies and with PICC lines specifically. The data from the pre and post test is presented in Table 5.

**Table 5**

*Comfort level differences between pre and post test responses*

<table>
<thead>
<tr>
<th></th>
<th>Not Comfortable</th>
<th>Somewhat Comfortable</th>
<th>Very Comfortable</th>
<th>Wilcoxon test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N$ (%)</td>
<td>$N$ (%)</td>
<td>$N$ (%)</td>
<td>$p$ value</td>
</tr>
<tr>
<td>Comfort with home infusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>2 (14%)</td>
<td>5 (36%)</td>
<td>7 (50%)</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>1 (7%)</td>
<td>6 (42%)</td>
<td>7 (50%)</td>
<td>.32</td>
</tr>
<tr>
<td>Comfort with PICC lines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>2 (14%)</td>
<td>5 (36%)</td>
<td>7 (50%)</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>2 (14%)</td>
<td>4 (29%)</td>
<td>8 (57%)</td>
<td>.32</td>
</tr>
</tbody>
</table>
A Wilcoxon test was conducted and the results were not significant for increased comfort providing home infusion therapies \((z = -1.00, p = .32)\) and for comfort with PICC lines \((z = -1.00, p = .32)\). However 100% of the nurses answered yes to the question, “Did the PICC program facilitate adaptation and increase independence in clinical practice?” on the post-test.

**Other Findings**

The pre and post test asked the question, “Do you document the specific type of PICC line in your charting?” and the results are presented in Table 6.

**Table 6**

*Documentation of PICC information on pre and post test responses*

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Wilcoxon test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>13 (93%)</td>
<td>1 (7%)</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>8 (57%)</td>
<td>6 (43%)</td>
<td>.03*</td>
</tr>
</tbody>
</table>

A Wilcoxon test was conducted and the results indicated a significant difference \((z = -2.24, p = .03)\). Ninety-three percent \((n = 13)\) answered that they do chart the specific type of PICC on the pre-test. Only eight of the fourteen participants answered yes on the post-test to the question.

**Summary**

This chapter described the sample and findings of an one hour continuing education program and the home health nurse’s knowledge and comfort level with the
Groshong PICC. Data suggested that a one hour continuing education program did significantly increase the home health nurse’s ability to identify the Groshong PICC and appropriate maintenance for the catheter. Pre and post intervention differences regarding comfort level was not significant, although all nurses answered yes to the question, “Did the program facilitate adaptation and increase progression toward autonomy?” Data showed that participants realized after the program that appropriate information describing the Groshong PICC was not being documented.
Introduction

Home health nurses care for and teach patients how to care for their PICC lines. The CDC (2004) estimates more than 50,000 people a year receive home infusion services. Nurses who receive ongoing education can improve PICC outcomes resulting in improved PICC longevity and reduced complications (Cardella et al., 1996). Neal’s (1999, 2000) theory of home health nursing practice states adaptation is the key to functioning successfully in home care.

Finding and Conclusions

Research Question 1: Will a CE program on the Groshong PICC assist home health nurses in their ability to identify the type of catheter being used and maintenance procedures required in the home setting? The results of the Wilcoxon test conducted to evaluate whether participants significantly improved their knowledge about Groshong PICCs after the one hour CE program indicated increased knowledge about the Groshong PICC. The participants were able to identify specific characteristics of the Groshong PICC ($p = .01$). Scores showed that 29% of participants were not knowledgeable on the pre-test and 100% of the participants were able to describe the Groshong catheter to some degree on the post-test. Seventy-one percent of the participants were able to list maintenance required for a Groshong PICC on the post-test, a significant difference from answers on the pre-test ($p = .01$) which indicated that 10 nurses were able to list maintenance required.
No research studies were found that focused on the education of home health nurses and their knowledge of Groshong PICCs. However, Cardella, et al. (1996) found that ongoing education can improve infusion therapy outcomes and decrease complications of the PICC. The results of this study are consistent with that previous study. However, the key is that education is ongoing.

Research Question 2: Will attendance at a CE program on Groshong PICC assist the nurse to adapt and progress toward autonomy? The results of the Wilcoxon test conducted to evaluate whether participants increased their comfort level providing home infusion therapies ($p= .32$) and comfort level with PICC lines ($p= .32$) was not statistically significant. Only one participant increased comfort level with providing home infusion therapies from not comfortable at all on the pre-test to somewhat comfortable on the post-test. All other participant answers on the post-test were unchanged from the pre-test.

No research studies were found that focused on comfort level of nurses when providing home infusion therapies. However, Neal’s (1999) theory of home health nursing practice involves time, experience, and confidence. If the participants could have been surveyed again in three to six months, after taking care of patients with Groshong PICCs, it is possible that comfort level would have been higher based on increased knowledge.

Results were very similar when looking at comfort level with Groshong PICC lines. Only one participant increased comfort level with PICC lines from somewhat
comfortable to very comfortable. The two participants who answered not comfortable with Groshong PICCs on the pre-test did not change their responses on the post-test.

An additional question regarding documentation of PICCs revealed that on the pre-test, 93% of participants charted the specific type of PICC line in their nurses notes. Post-test results revealed that only 57% of participants charted the specific type of PICC line in their nurses notes. These results were statistically significant ($p=.03$) showing that after the CE program, describing the detail of documentation of the PICC, the participants realized that they were not charting appropriate information regarding the specific type of PICC.

*Limitations*

One limitation of this study was use of convenience sampling, where only home health nurses from two rural agencies participated. This limits generalizability of the results. An additional limitation of this study was the small sample and all participants were female. Also, this study only looked at the immediate effects of the CE program and not the persistence of the effect. It is not known if there was any ongoing behavior change.

*Implications for nursing theory*

Neal’s theory of home health nursing practice (1999, 2000) was the supporting framework for this study. Neal describes three stages that home health nurses must pass through to reach autonomy. The three stages are dependence, moderate dependence and autonomy. Home health nurses who successfully adapt through passage of time, increased experience and confidence will ultimately become
autonomous in their practice. Nurses can revert to moderate dependence or dependence when faced with a different type of access device in the home. Ongoing education and inservices can assist the nurse to adapt and return to a more autonomous stage. This study indicated that the CE program on Groshong PICCs did increase ability to adapt and feel more confident in caring for the Groshong PICC in the home for a small number of participants, although, an increase in actual comfort level was not statistically significant.

Neal’s theory of home health nursing practice is an area of future research. Neal’s theory is still in the beginning stages of development. Neal’s theory describes more about the nurse, which is very useful for the home health nurse, but the theory is narrow in scope. It is very similar to Benner’s (1982) novice to expert theory with the addition of the adaptation component. It is the adaptation component that makes Neal’s theory appropriate for home health nursing. Home health is such an unique area of nursing. Nurses must be able to adapt to different environments and different equipment in each patient’s home. A home health nurse may be responsible for ten patients, each living in a different environment, each having a different type of PICC line, each using a different type of infusion pump. The nurse must be adaptable, to be able to provide safe and appropriate care to each patient. While Neal’s theory of home health nursing practice is very specific to home health practice it could be applied to any nurse working in any area. While the hospital nurse may see the same equipment over and over, technology changes and the nurse’s ability to adapt will assist in that nurse’s ability to feel comfortable and autonomous in his or her practice.
Implications for nursing research

There was no research found that looked specifically at home health nurses and Groshong PICCs in homecare regarding specific PICC knowledge and comfort level with home infusion. Past research has reported that many PICCs are placed in the hospital with the intention of delivery of infusion therapy in the home (Ault et al., 2001). Groshong PICCs have been shown to have longer dwell times with fewer complications, than open ended catheters (Hoffer et al., 1999; Hinson & Blough, 1996). Infection rates have been reported as low with both open ended and Groshong PICCs (Ault et al., 2001; Funk et al., 2001; Hoffer et al., 1999; Horrattas et al., 2001; Loewenthal et al., 2002; Miller & Dietrick, 1997; Skiest et al., 2000; Strahilevitz et al., 2001). Groshong PICCs have been shown to be cost effective even though initially Groshong PICC placement can be more expensive (Hinson & Blough, 1996; Horrattas et al., 2001; Miller & Dietrick, 1997). Studies have shown that the nurse taking care of PICCs have a significant impact on the success of PICC outcomes (Arrowsmith, 1999; Cardella et al., 1996; Funk et al., 2001; Miller & Dietrick, 1997).

Two studies were found that looked at the clinical and educational preparation of home infusion nurses (MacPherson, 1999; Sexton & Seldomridge, 2002). MacPherson (1999) found that the majority of nurses (87%) said nurses should have prior IV experience but only 60% of the nurses surveyed had prior IV experience before working in home care. Sexton & Seldomridge (2002) did a partial replication study of MacPherson’s (1999) work and found that 8% of homecare nurses who considered...
themselves home infusion competent had never performed central venous catheter care. In this study 72% of the participants had some hospital experience prior to working in home health, exposing them to some IV therapy. Unless the nurse has some critical care background or oncology experience, home care may be the first time a PICC is seen. This would indicate that more research is needed regarding homecare nurse competency in caring for PICCs in the home.

A question that arose with this study was, are home health nurses more adaptable than nurses who practice in more structured areas? Are there specific characteristics of home health nurses that lead them to practice in that area of nursing. Future research is needed to explore these areas as well.

Implications for nursing education

The advanced practice nurse (APN) can play a vital role in promoting independence of home health nurses. The importance of ongoing and repetitive education and training has been documented (Cardella et al. 1996) in achieving positive outcome with Groshong PICCs. The APN may develop and implement appropriate educational programs for home health nurses so that positive outcomes may be applied to home care as well.

Implications for practice

APNs using Neal’s theory of home health nursing practice can be a resource for other home health nurses in assisting them in reaching autonomy of practice. The nurse who is adaptable and understands the movement back and forth between different levels of dependency and the ultimate level of autonomy can be role models for
new nurses entering the home health area of nursing practice. Ongoing education is necessary, even for autonomous nurses, so that they may maintain that level of practice. APNs have the knowledge, experience and comfort level to be successful as autonomous home health nurses.

Of the three home health agencies that participated in either the pilot study or the research project, none had an APN on staff. Home care is an area where APNs are needed to assist other nurses in their goal to be autonomous.

**Summary**

The purpose of this project was to evaluate the effects of a continuing education program for home health care nurses based on the use and maintenance of the Groshong PICC in home health care. The results of the project suggest that an one hour continuing education program on Groshong PICC in Home Care is helpful in increasing knowledge among home health nurses working in the rural setting. The major limitation of this study was that the sample was one of convenience and the sample size was small, therefore the results may not be generalizable to other groups.

The literature suggests that repetitive and ongoing education can be effective in increasing knowledge and positive outcomes with Groshong PICCs. Through an one hour education program on Groshong PICCs nurses can adapt and become autonomous in their practice. No literature was found that addressed specifically home health nurses and Groshong PICC use in the home. Implications for nursing practice; APNs can actively participate in research regarding Groshong PICCs in home care.
Home health APNs can provide ongoing education and support for other home care nurses. Home health APNs could also design and implement education programs to assist home health nurses adapt in their practice and ultimately become autonomous in practice.
References


ABSTRACT

The purpose of this scholarly project was to evaluate the effects of a continuing education program for home health care nurses based on the use and maintenance of the Groshong PICC in home health care. Neal’s theory of home health nursing practice was the nursing framework used for this study.

A non-experimental, pre-test post-test design was used to evaluate the effectiveness of a continuing education program on Groshong PICCs in homecare and increasing the nurse’s ability to adapt and move toward autonomy. The one hour program was presented at one rural, hospital-based home health agency and one rural, public health home health agency, to registered nurses who provide home infusion therapies.

The results of the project suggest that an one hour continuing education program on Groshong PICC in Home Care is helpful in increasing knowledge among home health nurses working in the rural setting. Implications for nursing practice; APNs can actively participate in research regarding Groshong PICCs in home care. Home health APNs can provide ongoing education and support for other home care nurses. Home health APNs could also design and implement education programs to assist home health nurses adapt in their practice and ultimately become autonomous in practice.
APPENDIX A

Behavioral Objectives
1-2 objectives per hour. Must start with a behavioral, measurable verb

Outline of program Content
Content must relate to each objective and not be a restatement of the objective. Must be sufficiently detailed to reviewers to know what will be presented.

Faculty Name
Single Faculty: list name once. Multi-faculty : list name(s) related to content.

Time Frame
List time for each objective & section of content

Introduction
Grohsong PICC in Homecare
Mary Ames RN BSN CRNI

Discuss home infusion in homecare
A. Home Infusion in homecare
5 min

Discuss peripherally inserted central catheter (PICC) use in homecare.
A. Indications for PICC use in homecare
B. PICC Tip Placement
  1. Superior Vena Cava
C. Types of PICCs
  1. Peripherally Inserted Central Catheter (PICC)
    a. Open ended PICC
      1. Cook
      2. Per Q Cath
      3. L-cath
    b. Valved PICC
      1. Groshong PICC
15 min

Identify characteristics of the Groshong PICC
A. Construction
  1. Silicone
  2. 3-way Groshong Valve Design
  3. Radiopacity
  4. Sutured or unsutured
B. Indications for use of Groshong PICC
C. Advantages of Groshong PICC
D. Contraindications for Groshong PICC
A. Dressing Changes
10 min

Describe maintenance protocols of the Groshong PICC
1. Post insertion
2. Weekly maintenance
B. Flushing
  1. After use
  2. Weekly maintenance
  3. Blood draws
C. End Cap Changes
10 min

Identify complications associated with Groshong PICC
A. Infection
B. Catheter breakage
C. Catheter separation from catheter adaptor
D. Occluded Catheter
E. Difficulty Drawing Blood
F. Air Embolism
G. Central Vein Thrombosis
10 min

Evaluations
Appendix B

Pre-Test

1. Describe how a Groshong PICC differs from other PICC lines.

2. What catheter maintenance is required for a Groshong PICC?

3. Do you document the specific type of PICC line in your charting?

4. Please circle the number that best corresponds with how comfortable you are providing home infusion therapies.
   1. Not comfortable at all
   2. Somewhat comfortable
   3. Comfortable
   4. Very comfortable

5. Please circle the number that best corresponds with how comfortable you are with PICC lines?
   1. Not comfortable at all
   2. Somewhat comfortable
   3. Comfortable
   4. Very comfortable

6. How were you prepared to provide home infusion therapies?

7. What nursing experience did you have prior to working in homecare?

8. How many years have you been a nurse? ________________

9. How many years have you worked in homecare? ________________

Approved by MCO IRB
APPENDIX C

Post-Test

C. Describe how a Groshong PICC differs from other PICC lines.

D. What catheter maintenance is required for a Groshong PICC?

E. Do you document the specific type of PICC line in your charting?

F. Please circle the number that best corresponds with how comfortable you are providing home infusion therapies.
   1. Not comfortable at all
   2. Somewhat comfortable
   3. Comfortable
   4. Very comfortable

G. Please circle the number that best corresponds with how comfortable you are with PICC lines.
   1. Not comfortable at all
   2. Somewhat comfortable
   3. Comfortable
   4. Very comfortable

H. Groshong PICC in Homecare program facilitated adaptation and increased independence in clinical practice.
   1. YES  2. NO

I. Additional Comments:

Survey #__________
August 6, 2004

Mary Ames RN, BSN, CRNI
2539 Old State Rd.
North Fairfield, OH 44885

Dear Ms. Ames:

We would be happy to have you present the educational program on the Groshong PICC to our home health nurses.

Fall would be an acceptable time for us. Please contact me when you have formed definite time frames.

If we can assist you in any manner, please let us know. Please call me at 419-526-5623 ext. 109. Thank you.

Sincerely,

Rochelle Koch RN
Home Health Supervisor
MEMORIAL HOME HEALTH AND HOSPICE
ELIZA RAMSAY HOME
430 SOUTH MAIN STREET
CLYDE, OHIO 43410
419.334.6626
or 419.547.6419

Carrie Drown
Memorial Home Health and Hospice
430 S. Main St.
Clyde, Ohio 43410

Mary Ames
2539 Old State Rd.
North Fairfield, Ohio 44855

August 16, 2004

Dear Mary,

I am happy to give you my permission to present your Groshong PICC educational program to our staff at Memorial Home Health and Hospice in the fall. I look forward to your presentation and meeting you.

Thank you,

Carrie Drown, BSN, MBA, MSN
Clinical Operations Manager