Does Nurses Confidence Improve After Attending a Training for Teaching Home Infusion Patients?

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Does Nurses’ Confidence Improve After Attending a Training for Teaching Home Infusion Patients?

by

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MSN, Western Governors University, 2019
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Project Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing Practice

University of New Mexico College of Nursing
May 2022

Committee Chair: Dr. Melissa Cole
Committee Members: Dr. Meaghan M. Carey Eiland
Abstract

Discharge can be a difficult step for patients and their families and a challenging task for nurses. Poor instructions have a negative impact on the patient population. In addition, improper and incomplete discharge information negatively affects the post-hospital recovery period and may cause the patient to return to the hospital for the same episode of care. Returning to the hospital emergency room or readmission for the same episode of care will increase the dangers to the patient’s health and recovery plan and increase the cost of individual healthcare. The patient population ranks the quality of discharge information via their responses to the HCAHPS (Hospital Consumer Assessment of Health Care Providers and Systems) score (Centers for Medicare & Medicaid Services, 2020). The CMS uses these scores to rank hospitals and guide reimbursement (McIlvennan et al., 2015). With the rise of the hospital-at-home model and a nurse shortage, more technical skills usually performed in hospitals and by home health nurses have been handed on to patients and their families/caregivers. Home infusion is a technical and essential mode of continued therapy taught to discharged patients. This study aims to find out whether staff nurses' confidence in teaching discharged home infusion patients (HIP) improved after a formal in-service training program on how to teach HIP patients to administer their intravenous medication at home. The study goal is to improve quality through educating and verifying the confidence of the staff nurses. Data were collected using a survey to confirm the assumption that the information impacted outcomes positively or negatively, or not at all. This study took approximately 10 weeks, from collecting evaluation data through the
training and post-training data collection and analysis. Outcomes of the study were assessed using the Kirkpatrick method.
Dedication

I dedicate this work in loving memory to my late mother, Louisa Nelson, who came to the United States as a Cuban refugee, bringing four daughters. My mother’s childhood dream was to become a nurse, but my grandpa would not allow her to live away from home. One day while in the eighth grade, after seeing how exhausted my mother looked after work, I decided that I was not going to let her down. Thank you, Mom, for sharing your dream with me. It has been my great pleasure to humble myself in service to my patients and colleagues. Your instructions have yielded many benefits to me and others.

To my family, I want you to know that you are the greatest of my accomplishments. I am proud of the honorable people that you all are. To my five children—Dream Crumby, Shalom Mathurin, Shardae Higuchi, Sylvester Dennis-Young, and Surya Dennis-Young—and my eight grandchildren—Bryson Crumby, Matthea Mathurin, Ayanah Higuchi, Amaya Mathurin, Mathias Mathurin, Max Mathurin, Amari Mathurin, and Wolfgang Dennis-Young—I want you all to know that if you have life, you have hope and you can pursue your dreams.

I thank Paul Young and Sylvester for all the IT help and proofreading that you have both done for me. Paul, thanks for all the help with the graphics. Surya, thank you for your support throughout this journey. To my protégé, Seblewengal Sirage, thank you for all your help, support, and resources. It has been satisfying to watch you grow in your nursing career.

To my classmates, Lori, Nicole, Bobby, Brenda, Judy, the collaboration and support for one another have anchored us and brought us through this program. Lori and
Nicole, and Brenda, thank you for your unselfish support. I look forward to continuing our friendship.
Acknowledgments

I would like to acknowledge my chair, Dr. Melissa Cole, for her encouragement and for buying into my success. Dr. Cole, you are the gold standard for mentoring students. Your unselfish grace will always be remembered.

To Dr. Jan Martin, for the maternal instinct that you very carefully used to coach my class forward to Appendix A. There would be no Chapter One, Two, or Three without you.

Dr. Meaghan M. Carey Eiland, my committee member, thank you for your participation and feedback.

To Mr. Blake Boursaw: thank you for teaching us bite-size pieces of your beloved statistics. The way you coached me while constantly reminding me of my clinical strength was much appreciated—the College of Nursing benefits from your contribution.

To Dr. Ellen Schimmels, thank you for listening to our class and for making evident improvements to the structure and support of the class of 2022. These benefits have had an immediate positive impact.

Dr. Christine Delucas, thank you for your encouragement on that first phone call where you explained the application process.
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<tr>
<td>ACA</td>
<td>Patient Portability and Affordable Care Act</td>
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<tr>
<td>CMS</td>
<td>Centers for Medicare and Medicaid Services</td>
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<tr>
<td>HCAHPS</td>
<td>Hospital Consumer Assessment of Health Care Providers and Systems</td>
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<tr>
<td>HIP</td>
<td>Home infusion patients</td>
</tr>
<tr>
<td>VAD</td>
<td>Vascular access device</td>
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Does Nurses’ Confidence Improve After Attending a Training for Teaching
Home Infusion Patients?

Chapter 1

Introduction and Background

Patient discharge education is increasingly important for improving clinical outcomes and reducing hospital costs. Additionally, reducing hospital readmissions is a national focus for health care reform. The 2010 Patient Portability and Affordable Care Act (ACA) supports the notion that although all readmissions are not preventable within a 30-day period, a significant number are. The ACA policy created a mandate for all hospitals to monitor their discharge and readmission rates to minimize the incidence of readmission within 30 days of discharge. The policy has also put in place a system that requires Center for Medicare and Medicaid Services (CMS) to both monitor and administer financial penalties if hospitals have excessive readmissions rates within 30 days after discharge. More than half of the hospitals in the United States have been affected by these penalties (Jenq et al., 2016).

Hospital readmissions are monitored closely by CMS’s Hospital Readmissions Reduction Program (HRRP). Beginning in 2009, public hospital reports showed many patients would return within 30 days for the same diagnosis (Gupta & Fonarow, 2019). This points to a considerable pre-existing issue within the health care system. Readmissions for the same diagnosis within 30 days of discharge create issues including inconsistent continuity of care, quality metrics, costs, and resource allocation. Considerations of care beyond the hospital should be an important part of a hospital’s continued care management. The health care penalties and reporting resulting from the ACA went into effect in 2013 (Gupta & Fonarow, 2019), and since that time hospitals have put in place quality improvement (QI)
initiatives as well as population health management policies and procedures to ensure risk assessment and to help identify patients at high risk for readmission.

It is assumed that this gap also occurs at the study hospital due to how the health care staff communicate internally and how the facility is structured to communicate with outgoing patients and their families. Scott et al. (2019) showed evidence that the confidence of both nurses and patients improved with use of the teach-back method. Discharge can be an overwhelming transition for patients and families and an overwhelming task for nurses. This overwhelm can result in inconsistencies and deficits in both the nurses’ teaching and the learners’ understanding if the guidelines are not well defined. Without a clear guide, it is difficult to produce any consistent method to provide instruction. Without consistency in the delivery of instructions, some patients have also reported an insufficient set of skills among nurses giving discharge instructions.

The home infusion pharmacy patients at the study facility frequently commented to the on-call pharmacist that the nurse was trying to figure out the instructions and carry them out at the same time. In some instances, the patients reported that they and the nurse were trying to figure out the instructions together. Such a deficient set of skills often leads to patient confusion and missed doses, further confirming the importance of having consistency in home infusion discharge teaching. Practice delivery can become compromised when the training and delivery of the same sets of care are presented inconsistently. A nurse’s knowledge about how to assess and care for intravenous lines impacts their ability to teach patients how to manage their intravenous lines at home. When a patient misses or inadequately administers their dose at home, it leads to improper dosing. It can also lead to re-entry into the acute hospital system. As such re-entry continues to occur, it places an
additional amount of stress on the health care staff as well as on the patients and family members of home care teams.

Problem Statement

Once at home, patients and families have reported having difficulties with the administration of medications (O’Halloran et al., 2008). Poor and inconsistent instructions affect the patient community and impact funding as well as the overall Hospital Consumer Assessment of Health Care Providers and Systems (HCAHPS) score. Improved patient instructions allow for a more straightforward discharge process to be in place, which in turn, reduces confusion among staff and reinforces consistency with discharge teaching of home infusion patients (HIP).

Aims of the Study

The aims of this QI study were to (a) examine the study hospital nurses’ confidence level in their skills/knowledge of home infusion protocols and techniques, (b) provide a training on the home infusion protocols and techniques to the nurses, and (c) investigate the nurses’ confidence level in their skills/knowledge of home infusion protocols and techniques after the training. This study has several implications for the immediate nursing community at the hospital and for the field of nursing.

PICOT Question

Is staff nurses’ confidence in teaching discharged HIP improved after a formal in-service training program on how to teach HIP patients to manage their intravenous medication administration at home?
Chapter 2

Literature Review

This literature review confirmed that much focus has been placed on the importance of care outcomes that depend on adequate discharge instructions of hospitalized patients (Gupta & Fonarow, 2018). This review utilized a search of scientific research documents in the PubMed and CINAHL databases with key search terms as follows: discharge teaching, discharge information, home infusion, intravenous administration at home, and effective discharge. In addition, information on the following topics was searched: readmissions, discharge planning, discharge teaching, home infusion techniques and applications, outcomes and competency of families as caregivers, and non-health care professionals providing medical care at home.

Readmissions

In their article “The Hospital Readmission Reduction Program–Learning from Failure of a Health Policy,” Gupta and Fonarow (2018) discussed the 30-day risk time limit as the standard set by the new ACA policy beginning in 2013. They reported that 79% of U.S. hospitals were penalized in 2017. Gupta and Fonarow also discussed various interventions that affect discharge outcomes. Penalties assigned for premature readmission for the same event became a safety measure for patients’ continuing care at home. Gupta and Fonarow’s research also validated that hospital HCAHPS scores give the patient community a standard of measurement to rely on when seeking a health care institution to trust with their care. Jenq et al. (2016) also supported the ACA policy’s argument with a quasi-experimental evaluation of the effectiveness of a large-scale readmission reduction program that aimed to reduce readmissions by adding interventions for high-risk patients.
**Discharge Planning**

Couturier et al.’s (2016) study demonstrated a significant relationship between the discharge process and post-hospital care outcomes. This article supports the importance of discharge planning and is relevant to the continuity of care outcomes. The process of discharge planning should begin taking place at the time of admission to allow the different dynamics and care provisions to be put in place ahead of the day of discharge. Discharge planners must focus on assessing both the patients’ physical limitations and their home environment to adequately plan for their recovery at home Gabriel et al. (2017). Leff et al.’s (2009) study showed that with the increased prevalence of hospital-at-home approaches, discharge planning has become more and more crucial in preventing adverse outcomes. Studies have shown that patients recovering at home show improvement over a shorter duration of time than the improvement documented in the hospital environment.

In a study discussed on PSNet (2020), discharge planning was shown to be essential in the transition of care; To be able to evaluate the physical and social needs of the patients and families. To evaluate their physical and emotional readiness for the transition process, from the hospital to continue care at home. Research shows that nurses play a significant role in the discharge process, coordinating care and engaging with key stakeholders such as families and community providers to ensure smooth care transfers (PSNet, 2020).

**Discharge Teaching**

The Agency for Healthcare Research and Quality (PSNet, 2020) found that the day of discharge is often unpredictable, leading to rushed and sometimes overwhelming amounts of discharge information given to patients and families. Researchers noted that the habit of communicating critical information on the day of discharge gives patients and caregivers the
impression that the procedure is rushed (PSNet, 2020). Mabire et al. (2018) focused on nursing discharge and planning effectiveness related to a specific group of patients and their health outcomes. The transitional care model was one of two models specified in their meta-analysis. This model focuses on several core elements and identifies patients and their caregivers as essential in discharge teaching and as the first line for securing the safety of care outcomes from home. This model also focuses on communication between the discharging nurse and the patient/family. Bobay et al. (2018) focused on the nurse as an essential player in assessing, confirming, and preparing patients and families for discharge. Their study "demonstrates the value of nurse assessment of discharge readiness in contributing to efforts to improve the transition to home and decrease unplanned return to hospital" (Bobay et al., 2018, p. 305).

Discharge teaching is a vital part of nurses’ knowledge base and should be incorporated into their training and bank of knowledge from early in their fundamental training. A nurse’s confidence in passing on health care information to patients and family caregivers is crucial in the discharge process. Blazeck et al. (2016) discussed using interactive video-based teaching to improve nurses’ ability and confidence to provide patient-centered discharge teaching. A checklist of the required discharge information is a useful tool to confirm the teaching and learning of the patients and to be a guide for the nurse as the bedside educator (Blazeck et al., 2016). The checklist information also reminds the nurses what subjects to cover in the specific education process; this can improve nurses’ confidence in the presentation to patients and their families. Grimes-Holsinger (2002) referred to the checklist as a tool for reducing the amount of time required to make a patient independent in administering an antibiotic, along with serving as a useful tool in providing instruction and
improving communication. Cox and Westbrook (2005) emphasized the importance of family as caregivers and their successful efforts in learning and performing home infusion therapy to other family members on intravenous therapy. A nurse’s knowledge of the vascular access devices (VADs) used for home infusion is essential to prevent infection by teaching and confirming the patient/family caregiver’s understanding and confidence in the daily management. Osti et al.’s (2019) article discussed the benefits and drawbacks of numerous outpatient parenteral antibiotic treatment services.

**Home Infusion Techniques, Applications, and Outcomes**

This review of the literature found few studies that addressed teaching patients who were expected to carry out infusions at home as a provision in their continued care. O’Halloran et al. (2008) used a prospective, non-experimental cohort design to examine the ability of discharged patients to self-administer home infusions. They found that patients’ difficulties with conducting activities of daily living varied depending on the location of their VAD. Standards of practice and recommended techniques for performing infusion safely at home and in the community are set forth in the Home Infusion Standards of Practice (Gorski, 2021). The committee that sets and monitors home infusion standards of practice is reviewed and updated every five years (Gorski, 2021). The techniques recommended by these standards provide the guidelines for the nurse as an educator to instruct the patient and their caregivers. Malone et al. (2015) studied the cost impact of patients on long-term intravenous therapy and the financial cost reduction benefits of home infusion. In addition to the well-documented benefit of lower infection rates at home compared to care in the hospital environment, Skokal (2000) highlighted the home intravenous push administration of antibiotics as one of the latest moves in the hospital-to-home movements. Home-based
intravenous care can result in poor outcomes if families as caregivers and patients are not evaluated for their abilities to perform daily living activities, with the added meticulous responsibility of the home infusion. Skokal’s (2000) study showed that PVC-related problems are relatively common in home-based care settings. Nakayama et al. (2018) recommended that safer vascular devices be used. Not all patients are physically or socioeconomically prepared for the responsibilities or costs of the home infusion. Although home infusion has been deemed safe, barriers depend on patients’ and families’ ability to learn and manipulate the technical aspects of the procedures. Another barrier is cost; for example, uninsured patients cannot afford the cost of home infusion therapy (Bhavan et al., 2015).

### Competencies of Families as Caregivers

Fields et al. (2020) wrote about one of the main concerns of this literature review: the question of the preparation, instruction, and validation of techniques that are being taught to patients and families tasked with managing home infusion therapy. Carter (2015) suggested that patient and family candidates for home infusion need to be carefully screened and assessed for the suitability of home infusion as a treatment plan. Questions that a nurse should ask when assessing a patient or family, according to Carter (2015), include: Is there a safe place in the home for storing and infusing the medication? How compliant to the treatment plan does the patient/family appear to be? Are the patients trainable? Does their cognitive level allow for following instructions? What might additional support be needed? Gorski (2019) addressed the impact of home infusion on caregivers as well as the nursing implications for assessing and planning for how home infusion impacts families. Her article examined non-health care providers administering this technical aspect of their family
member’s care. Gorski’s (2019) study concluded that placing the VAD on a patient’s non-dominant hand or side was advantageous to the patient’s performance in their activities of daily living. It can be inferred from this study that a patient would also be better able to perform self-infusion if their dominant hand were free. O’Halloran et al. (2008) suggested this might be one of the first assessments that discharging nurses need to be taught.

**Summary of the Literature**

This review of the literature established important causes and effects of discharge teaching, its impact on patient and family outcomes, and its impact on hospitals in the form of repayments and surcharges from CMS (Gupta & Fonarow, 2019). The stakeholders are on both sides of the care continuum. The patients and families have their continued health and recovery in the game. The hospital administration and regulatory agencies also have to prove a reduction in cost as well as reducing intentional and unintentional losses from patients returning to the hospital within the same episode of care (Ubbink et al. 2014).

Gupta and Fonarow (2018) discussed the 30-day risk time limit as the standard set by the new ACA policy. They reported that 79% of U.S. hospitals were penalized in 2017. Research validated that hospital HCAHPS scores give the patient community a standard of measurement. The process of discharge planning should begin at the time of admission to allow the different dynamics and care provisions to be put in place ahead of discharge (Couturier et al., 2016). Studies have shown that patients recovering at home show improvement over a shorter duration of time than the improvement documented in the hospital environment. Discharge planning is essential in the transition of care for patients and their families (PSNet, 2020). The day of discharge is often unpredictable, leading to rushed and sometimes overwhelming amounts of discharge information. Mabire et al. (2018)
focused on nursing discharge and planning effectiveness related to a specific group of patients. This model also focuses on communication between the discharging nurse and the patient/family. Discharge teaching is a vital part of nurses' role and should be incorporated into their training. A checklist of required discharge information is a useful tool to confirm the teaching and learning of the patients (Blazeck et al., 2016). Information on the checklist also reminds the nurses what subjects to cover in the specific education process (Grimes-Holsinger, 2002). Home-based intravenous care can result in poor outcomes if families as caregivers and patients are not evaluated for their abilities to perform daily living activities. Standards of practice and recommended techniques for performing infusion safely at home and in the community are set forth in the Home Infusion Standards of Practice (Gorski, 2021). The impact of home infusion on patients and families has been reviewed. Questions that a nurse should ask are: Is there a safe place in the home for storing and infusing medication? How compliant does the patient appear to be? Are the patients trainable? What might additional support be needed (Carter 2015)? Gorski (2019) addressed the impact of home infusion on caregivers as well as the nursing implications for assessing and planning for how home infusion impacts families.

A gap in the literature exists in relation to the education of nursing staff on how to proceed when teaching patients and families how to set up and infuse their doses of intravenous medications at home. This review found few studies that addressed teaching patients who were expected to carry out infusions at home as a provision in their continued care (Bobay et al., 2018, p. 305). No studies were found on outcomes for staff nurses who were taught how to instruct HIP and their families to carry out infusions at home—the current project attempted to address these gaps in the literature.
The transitional care model was developed to outline a discharge process that includes follow-up for high-risk older patients with chronic conditions. Among the elements of this model are a transitional nurse to develop a discharge plan. A discharge team is a multidisciplinary group focused on discharge preparation. Additionally, patients are involved in discharge education, during which there is emphasis on continuity of care and communication between care providers and patients. Post-discharge follow-up is an essential component of the transitional care model. The family as a caregiver unit is considered an integral part of the discharge plan. Self and/or family management is part of the education for care at home that is expected to reduce incidence of readmission to the hospital for the same episode of illness (Bobay et al., 2018).

Theoretical Model

Lewin's change theory has been selected as the theoretical model for this study. In this theory, there are three components of establishing a change. In relation to this study, change occurred as nurses and their organization moved from the current state of how home infusion was addressed at discharge to a future stage in which nurses could confirm confidence in their ability to teach discharge information to IV patients. The first stage is simply identifying the problem that needs to be changed and breaking the existing patterns of how discharge IV teaching is presented. At this stage, the nurses must understand the need for the change and embrace potential benefits that will result from the change. This is referred to as unfreezing. The next stage is gathering information to support the change that is required, also referred to as moving. During the moving phase of the change, nurses received
clear communication on the desired outcomes of their confidence in patient IV teaching. The third stage is stabilizing the change, or re-freezing. This is done by incorporating the change into the value system of the staff nurses. This third stage is where nurses’ commitments to their new confidence in their teaching strategies were formed. This is also the phase where commitment to continued re-education and update of knowledge would be made (Lewin, 1951). The overarching goal of this intervention was for staff nurses at the study hospital to be confident when teaching the IV-push method to HIP. Using Lewin’s change theory model helped to usher in the needed changes on a fundamental level, allowing the organization to create considerable realignment and adopt teaching standards throughout the organization, confirming its core values to be even more patient- and family-care-centered (Sullivan, 2012).

**Methodology**

The goal of this project was to improve quality through educating and verifying confidence among staff nurses. Data were collected to compare staff nurses’ knowledge and skills before and after the training and to determine whether the information had impacted outcomes positively, negatively, or not at all. This research took approximately 10 weeks, from collecting evaluation data through the training and post-training data collection and analysis. Data analysis employed a quantitative method to assess the assumptions (O’Halloran et al., 2008).

The target audience for this study is hospital staff nurses, as they are the primary nurses doing discharge education at the study facility. The target audience is comprised of staff members employed full-time, part-time and per diem as RNs.
Ethical Issues

The student conducting the study identified the risk and harm to participants as negligible. Privacy concerns were considered. Each participant was assigned an identification number that corresponded with their email address. Name identifiers were kept in a locked office to keep responses confidential. All attempts were made to protect participants’ psychological and physical well-being (Dixon, 2017).

Quality

QI participation is an intrinsic component of being a health care provider. Staff nurses at the hospital understood that a part of their hire and professional obligation involves the participation in QI projects. The participants were fully informed of the depths of the project. No personal information was collected from the participants (Lynn et al., 2007).

Setting

The setting used in the evaluation for the QI project was a 126-bed community hospital that is within an organization of hospitals and insurance companies. This hospital organization serves a wide variety of population types. It is both multiracial and multicultural and therefore serves a large variety of socioeconomic communities.

Study Population

The study population was comprised of the hospital’s staff nurses as designated by the institution’s nursing education director. The director agreed to support this QI project. The sample of participants was taken from the medical surgical clinical units of the hospital.

Planning the Intervention

For the intervention, a Plan Do Study Act (PDSA) model was used. This is a model that is widely used in health care and other business settings for planned improvements for
best practice outcomes. The participants completed an eight-question Likert’s assessment tool (McLeod, 2019) to determine their confidence with teaching HIP to manage their IV doses at home. The staff nurses then participated in an information review teaching module. The student who conducted the study asked the staff nurse participants to take the pre- and post-survey. An additional survey was repeated three weeks after the staff had an opportunity to use the reviewed information and apply the teaching to the process. Participation was voluntary and was supported by the hospital’s clinical education director.

Timeline

Figure 1

*Project Timeline and Activities*

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Budget

No funds were needed for this project. Thus, no budget was calculated for this study. Access to the participants was voluntary and approved by the medical center administration.
Chapter 4

Results and Discussion

Results

Data were collected at three times during this short process (see Figure 1). The first set of data was collected after the pre-evaluation. The second set of data was collected after the education module was applied. The participants were evaluated a third time at three weeks after the module to collect data on their confidence level. The pre- and post-evaluation tools have been gathered from the Infusion Nurse Standards of Practice (Gorski, 2021) and the Institute of Safe Medical Practice on safe intravenous medication administration (see Appendix).

Data Analysis

Data analysis took place during a two-month period from the time of the pre-evaluation to the last sets of data collected. An eight-item confidence evaluation was administered prior to the training information module, immediately after the information, and three weeks after the module to address the research question: is staff nurses’ confidence in teaching discharged HIP improved after a formal in-service training program on how to teach HIP patients to manage their intravenous medication administration at home? The confidence evaluation was scored by treating the response options for each item from not confident to extremely confident as a 1 to 5 scale, then adding across items to get a total confidence score.

The pre- and post-total confidence scores were computed statistically using the Mann-Whitney U Test. This non-parametric statistical hypothesis test computed the mean of different samples from the pre- and post-evaluation to determine whether the evaluation
mean outcome differed. It was assumed that the nurses’ confidence would improve after receiving an education module of basic IV medication administration information.

The statistical analysis was done with the website Social Science Statistics. Table 1 shows the participants and their professional ranking. One hundred percent of the participants were registered nurses. Eighty-eight percent had bachelor’s degrees, and approximately 11% had associate degrees.

Table 1

Sample Characteristics and Demographics

| Table 1. Sample characteristics ($N_1 = 10; N_2 = 10; N_3 = 9$) |
|---------------------------------|-----------------|-----------------|-----------------|
| Time 1                          | Time 2          | Time 3          |
| $n$                             | $n$             | $n$             |
| %                              | %               | %               |
| RN                             | 10              | 10              | 9               |
| Yes                            | 10 100          | 10 100          | 9 100           |
| No                             | 0 0             | 0 0             | 0 0             |
| Degree                         | ADN 20%         | ADN 20%         | ADN 11%         |
| BSN                            | 8 80%           | 8 80%           | 8 88%           |

The graph in Figure 2 represents the mean graphs of all three data collection points.

Figure 2

Mean of Three Data Points
The pre-mean shows the confidence levels of the nurses before the educational information. The average confidence scores before the information were 3.5, with 3.0 being confident. The post-mean shows an increase in the nurses’ confidence after they had the education; their scores went from confident to slightly above very confident at 4.5, with a significance score of 0.05 (significant since \( p < 0.05 \); see Table 2). The follow-up mean shows that even with a slight decline in confidence scores over the three weeks since the information was given, scores were still slightly higher than the pre-mean confidence scores, remaining in the very confident range at 4.0. Significance was calculated at 0.07, indicating that the decrease in confidence was not significant in relationship to the gain in confidence after the information. Post-information confidence scores produced an \( r \) score of 0.63, indicating that the educational information had a large effect on the nurse’s confidence. At the three-week follow-up, \( r \) was calculated at 0.41, signifying that though there was a slight decrease in the confidence levels, the confidence the nurses gained from the education had been sustained.

**Table 2**

*Mann-Whitney U Test Results*

<table>
<thead>
<tr>
<th>Time</th>
<th>( n )</th>
<th>( M )</th>
<th>( SD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 (PRE)</td>
<td>10.00</td>
<td>3.65</td>
<td>0.59</td>
</tr>
<tr>
<td>Time 2 (POST)</td>
<td>10.00</td>
<td>4.53</td>
<td>0.81</td>
</tr>
<tr>
<td>Time 3 (FOLLOW UP)</td>
<td>9.00</td>
<td>4.10</td>
<td>0.86</td>
</tr>
<tr>
<td>( U^{a} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 v. Time 2</td>
<td>12.00</td>
<td>-2.83</td>
<td>0.01</td>
</tr>
<tr>
<td>Time 2 v. Time 3</td>
<td>22.50</td>
<td>1.80</td>
<td>0.07</td>
</tr>
</tbody>
</table>

\(^{a}\) Mann-Whitney \( U \) statistic
Comparing the pre-information survey mean with the post-information survey mean using the Mann-Whitney U test provided proof that the educational information was significant at both post-information and follow-up intervals.

**Strengths, Limitations, and Lessons Learned**

In this study, the reduced amount of time was a benefit to the student researcher because it aided in tracking the employee volunteers and keeping them engaged with the project throughout the data collection period. Several factors limited the study. First, the hospital was experiencing a COVID-19 surge. During the scheduled time of the project, 30% of the staff was absent due to illness. Several trips were made to the hospital to collect email addresses for participants. Forty-one email addresses were collected from nurses who were interested in participating in the study. The nurses were extremely busy and in crisis treatment mode and not able to fully engage in education and training (Evans, 2020). No one besides patients, including family members, was allowed to enter the hospital because of COVID-19 restrictions. Because the nurses were not able to sign up for the classes ahead of time, participants were not pre-loaded into the REDCap data collection system. Therefore, the survey was based on how many participants took the survey without their answers being tracked individually, so changes in the answers from one survey point to the next could not be tracked by individual respondents. A robust 50-minute in-person teaching in-service was originally planned. However, the plans for in-person instruction had to be revised. The initial revision involved videorecording the information. With confirmation that the nurses were far too busy and not allowed to wear earpieces at the desk or while signed into duty, the plan to present information via video was revised. A short, concise PowerPoint presentation was developed instead and made available to nurses to read if they had a chance. The focus of the
PowerPoint was to provide as much relevant information in as little time as possible. Ten respondents took the pre-survey, and ten respondents took the post-survey. The follow-up survey was taken by nine respondents.

The size of this study limits the generalizability of its results. In addition, the short duration of the data collection limited the amount of data that was collected. The evaluation tools had not been pre-published and were constructed from the information gathered from the Institute of Safe Medical Practice and the Infusion Therapy Standards and Practice (Gorski, 2021).

**Discussion**

This study aimed to fill gaps in the literature and determine whether staff nurses’ confidence in teaching discharged HIP improved after a formal in-service training program on how to teach HIP patients to manage their intravenous medication administration at home. The confidence evaluation was scored by treating the response options for each item of *not confident* to *extremely confident* as a 1 to 5 scale, then adding across items to get a total confidence score. Data analysis took place over two months from the pre-evaluation to the last sets of data collected. An eight-item confidence evaluation was administered before the training information module, immediately after the information, and three weeks after the module (see Appendix).

Using the Mann-Whitney U test to compare the pre-information survey mean with the post-information survey mean provided proof that the educational information was significant at both the post-information and follow-up intervals. The pre- and post-survey data demonstrated a marked improvement in the nurses’ responses after reviewing the information module. The Mann-Whitney U test demonstrated results of the $p$-value to be less
than 0.05, demonstrating significance as shown in Table 2. The effect size was calculated to be .063, indicating that the education information module had a strong positive impact on participants’ confidence levels. Average confidence scores before the information were 3.5, with 3.0 being confident. The post-mean shows an increase in the nurses’ confidence after the education. Their scores went from confident to above very confident at 4.5. The follow-up mean shows that even with a slight decline in confidence scores over the three weeks since the educational information, the follow-up mean was still higher than the pre-information means confidence scores, remaining in the very confident range at 4.0. Effect size showed no significant decrease, with a positive power $r = 0.41$. Research also validated that hospital HCAHPS scores give the patient community a standard of measurement to rely on when seeking a health care institution to trust with their care. Jenq et al. (2016) supported the ACA policy’s argument with a quasi-experimental evaluation of the effectiveness of a large-scale readmission reduction program that aimed to reduce readmissions by adding interventions for high-risk patients. The literature focused on several core elements and identified patients and their caregivers as essential in discharge teaching and as the first line for securing the safety of care outcomes from home. Mabire et al. focused on communication between the discharging nurse and the patient/family. Mabire et al. (2018) focused on nursing discharge and planning effectiveness related to a specific group of patients and their health outcomes. The study of Bobay et al. (2018) "demonstrates the value of nurse assessment of discharge readiness in contributing to efforts to improve the transition to home and decrease unplanned return to hospital" (p. 305). In addition, the Infusion Nurse Standards of Practice have emphasized the importance of training and validation of competencies for the caregivers providing infusion care. This training provides confidence in the safe administration of
intravenous medication among nurses teaching patients and families how to self-infuse. (Trentadue et al., 2020). This review of the literature found few studies that addressed teaching patients who were expected to carry out infusions at home as a provision in their continued care. In addition, no studies were found on outcomes for staff nurses who were taught how to instruct HIP and their families to carry out infusion at home. In line with the hypothesis, a non-parametric statistical hypothesis test was used to compute the mean of the pre- and post-evaluation samples to determine whether the evaluation rank outcome differed. It was assumed that the nurses’ confidence would improve after receiving an education module on basic IV medication administration. The limitation of this research was that not enough nurses were available to survey due to the COVID-19 pandemic. In addition, the study hospital was experiencing a COVID-19 surge. During the project’s scheduled timeframe, 30% of hospital staff members were absent due to illness.

**Interpretation of Findings**

**Teaching During COVID-19**

Several factors limited the study. First, the hospital was experiencing a COVID-19 surge. During the project's scheduled time, 30% of the staff members were absent due to illness. Several trips were made to the hospital to collect email addresses for participants. Forty-one email addresses were collected from nurses who were interested in participating in the study. The nurses were extremely busy and in crisis treatment mode and not able to fully engage in education and training (Evans, 2020). No one other than patients, including family members, was allowed to enter the hospital because of COVID-19 restrictions. Because the nurses were not able to sign up for the classes ahead of time, participants were not pre-loaded into the REDCap data collection system. Therefore, the survey was based on how many
participants took the survey without their answers being tracked individually, so individual respondents could not track changes in the answers from one survey point to the next. A robust 50-minute in-person teaching in-service was originally planned. However, the plans for in-person instruction had to be revised. The initial revision involved video recording the information. With confirmation that the nurses were far too busy and not allowed to wear earpieces at the desk or while signed into duty, that plan was revised to entail a short, concise PowerPoint that they could read if given a chance. The focus of the PowerPoint was to provide as much relevant information in as little time as possible. Ten respondents took the pre-survey, and ten respondents took the post-survey. Nine respondents took the follow-up survey.

**Best Practices in Educating Family During a Pandemic**

In thinking about best practices in educating families during a pandemic, I would have to conclude that the nurses needed to be strong in their knowledge of the basic procedures and processes that they were tasked to teach and on which they were to instruct the patients and families. There was little time to do any long study to become the expert on most of the techniques needed to hand off to the patients. Confidence in their knowledge base and flexibility were key resources that nurses needed in their arsenals of care.

**Patient-Centered Approach**

The answer to the question proposed in this paper, "Does Nurses' Confidence Improve After Attending a Training for Teaching Home Infusion Patients?" is yes. The motivation behind this study was generated from concerns at the home infusion pharmacy. A noticeable number of patients discharged from the hospital on home infusion therapy would call back to the pharmacy during off-hours with complaints of difficulties infusing their
intravenous doses. Some of the patients’ complaints were that the nurses did not exhibit confidence in their knowledge during the process of teaching. The patients commented, "we were figuring it out together"—we being the nurse and the patient—and. The patients also complained, "the nurse was figuring it out as they were giving the instructions." Often, the patients in this situation missed scheduled doses and would be routed to the hospital emergency room to receive their dose and get the extra teaching required to manage their IV therapy at home confidently. This study has confirmed that the nurses' confidence in instructing patients on IV therapy management has proven to increase with a focused set of education and information on teaching home infusion. Ultimately, the desired outcome is that as nurses' confidence increases, so will their ability to teach the home infusion patients successfully.

**Implications for Policy**

A policy may be informed by the lessons learned in this study; first and foremost is the importance of the constant update and review of the knowledge that defines the nurse as the competent expert he or she needs to be at all times. Time and resources are limited in a pandemic, as they would be in any health care or medical disaster crisis. Policies on skillset reviews and maintenance should be constantly updated and in place. Policies that highlight nurses' confidence in discharge education should be supported by policymakers and stakeholders tasked with improving care while lowering the cost per episode of care. The hospital-to-home trend is becoming more prevalent and will continue to do so. Recovering at home is cost-effective for health care as a business. Recovering at home has also been proven to reduce nosocomial infections and shorten the overall recovery time for the patients.
Conclusion

Quality improvement is expected within our professional discipline. This study aimed to meet the standards of continuous improvement in the areas of staff nurses’ confidence when discharging HIP and families to infuse their intravenous medications at home. This study has implications that can inform future studies related to educating nurses as bedside educators. Discharge information is crucial in the continuation of patient care and therapeutic outcomes. It is essential that nurses are confident in their abilities to educate patients when transferring care to non-health care patients and family caregivers. This study held the hope that participating nurses would be able to share their new or renewed confidence with other nurses to increase skill sets among one another.
References


Evans, N. (2020). Nurses on the front line of COVID-19 research trials. *Nursing Standard, 35*(7), 51–53. [https://doi.org/10.7748/ns.35.7.s19](https://doi.org/10.7748/ns.35.7.s19)


(OPAT) for foot infections in people with diabetes. *Diabetes/Metabolism Research and Reviews, 31*(6), 638–645. https://doi.org/10.1002/dmrr.2651


## Appendix

### Course Name
Teaching IV Push Medication Administration Competency for Patient/Family at Home to Staff Nurses

### Competency Statements
1. The staff Nurse as the learner will be able to demonstrate verbal understanding of instructing patient/family the IV push medication administration method for home.
2. The staff Nurse as a learner will be able to demonstrate physical manipulating of the equipment and supplies teaching patient/family how to administer IV medication at home.
3. The staff Nurse as the learner will demonstrate how to confirm that the patient/family has acquired the competencies needed to successfully perform IV push medication administration at home.

### Lesson Topic
The topic of this class, teaching the IV push medication method for at home administration by the patient and/or family member, will focus in on the critical steps that answer the why and the how of teaching the IV push medication administration to patients and their families for them to be able to successfully follow every important step at home.

### Learning Objectives
At the end of this course the staff Nurse will be able to:
1. The staff nurse will be able to evaluate their own confidence level in giving home infusion instruction to patients and families.
2. Explain to another nurse and preceptor a verbal knowledge of their own confidence level when assessing patients and family’s ability to carry out the home infusion procedures.
3. Evaluate their confidence in showing the patients and families the actual demonstration and return demonstration of the home infusion application and step by step procedures, of the skills of the IV push medication administration methods.
4. Verbalize their need for skills review and learning opportunities that will lead to their knowledge and confidence increasing.

### PRE-POST SCREENING QUESTIONNAIRE
The Likert Scale will be used to set up the questions of this screening tool. The Likert Scale was developed in 1932 to measure principles of attitudes by asking participants to respond
to a series of statements about a topic. The following screening tool have been adopted from the Likert Scale. (McLeod, S. A. 2008)

1. How confident are you when teaching IV push medication administration to patient and family?
   - Not Confident
   - Somewhat Confident
   - Confident
   - Very Confident
   - Extremely Confident

2. How confident are you when explaining the aseptic technique of IV teaching to the patient and family?
   - Not Confident
   - Somewhat Confident
   - Confident
   - Very Confident
   - Extremely Confident

3. How confident are you when explaining the actual procedure step-by-step to the patient and family?
   - Not Confident
   - Somewhat Confident
   - Confident
   - Very Confident
   - Extremely Confident

4. How confident are you when explaining the clinical signs of infection to the patient and family?
   - Not Confident
   - Somewhat Confident
   - Confident
   - Very Confident
   - Extremely Confident

5. How confident are you when explaining the drug information to the patient and family?
   - Not Confident
   - Somewhat Confident
6. How confident are you when instructing the patient and family on how to verify the accuracy of the medication for each and every drug administration?

- Not Confident
- Somewhat Confident
- Confident
- Very Confident
- Extremely Confident

7. How confident are you when instructing the patient and family on how to report error and incidence of incorrect labeling of medication and sign and symptoms (SS) of infection?

- Not Confident
- Somewhat Confident
- Confident
- Very Confident
- Extremely Confident

8. How confident are you assessing the patient’s and family’s ability to carry out self/family infusion at home?

- Not Confident
- Somewhat Confident
- Confident
- Very Confident
- Extremely Confident

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**Teaching Strategies**

Teaching strategies for this lesson plan are as follows:

1. To be clear about what I want the staff Nurses to learn.
2. Tell the staff Nurses what they need to know and show them what they need to be able to do.
3. Allow practice for the Nurses as the learner to return demonstration and return explanation of their demonstrations.
**EVIDENCE**

2. 2016 Infusion Therapy Standards of Practice (2017) by Gorski, Lisa A.

**Lesson Plan Details**

1. Define IV push medication for the patient and family. IV push medication administration is using a prefilled syringe of medication and slowly injecting the contents (medicine) into the catheter or tube that is connected to your vein. The medicine will go directly into your bloodstream.
2. The need to have clean hands is very important. Always wash your hand at home before you touch your catheter or before giving your IV medication.
3. You should gather the supplies you need on a clean surface before you begin to inject the IV medicine.
4. The supplies you need will be provided by the hospital and the home infusion pharmacy. For each dose of your IV medication, you will need: a. The actual medication in a syringe, b. Two (2) #2 syringes of normal saline (these are prefilled with 10ml of solution) and c. Three (3) alcohol wipes are also needed.
5. Before Administering the medication-look at the syringe with the medication in it. Read to confirm that it has your: name, the name of the drug, the dosage of the drug or the amount of the drug, frequency for the intake of the drug, and the drug’s expiration date.
6. The nurse needs to demonstrate how to prepare the syringe before use. The nurse must show how to remove air from the syringe before using them. To do this, the nurse will need to show the removal of the caps from the syringe. The cap needs to be placed upside down on a clean surface provided with the home infusion supplies. Then, hold the syringe upright with the open tip pointing up. The patient will then need to see the staff Nurse gently tap the sides; this will move bubbles to the top. Please learn to note to patient to not lay the syringe down when the cap is off. Gently pull down on the plunger of the syringe to unlock it. Next, gently push the plunger upward until a small drop of the fluid is at the top of the syringe. Replace the cap onto the syringe. Repeat this for all three...
syringes. The one (1) medication filled syringe and for the two (2) normal saline syringes.

7. Open the clamp on the IV tubing. An injection cap is attached to the end of the catheter to make it easier and safer to use.

8. How to clean the injection cap.

9. How to attach the syringe to the injection cap.

10. How to install or infuse the saline flush, and how to infuse the medication syringe by the flush-medication-flush method.

A non-gradable experience will be for the staff Nurses as learners to practice their methods via the supplies provided as a lab. In doing so the Nurses will be able to: 1. manipulate the syringes, 2. use a mannequin arm to practice correct insertion of the catheter, 3. practice attaching and removing the syringes, 4. practice cleaning the injection cap, 5. practice injecting the catheter via the push-stop method, 6. practice injecting 10ml over a period of 3-5 minutes while paying attention to the length of time.

Example questions that are centered around the purpose of this course and its learning objectives are:

Post Evaluation Tool

1. Circle whether the following statement is true or false
   True or False.
2. The injection cap should be cleansed for 15 seconds.
   True or False
3. The injection cap is cleansed how many times during each injection dose of IV push medications.
   a. once
   b. twice, or
   c. three times
4. It is okay to lay the syringe down after the cap is removed.
   True or False
5. Which direction is the syringe turned after attaching it to the injection cap so that it will be locked in place?
   Right or Left
6. Which direction is the syringe turned to unlock and remove it from the injection cap?
   Right or Left
7. Describe the start and stop method of the IV push method.
8. A patient sent home on IV medication commonly has which kind of Vascular access device.
   1) a peripheral line
   2) a centrally inserted peripheral line
   3) a peripherally inserted central line

9. What information will be present on the medication syringe that the nurse will need to teach the patient to check for at each infusion.
   a. Name of the patient
   b. Name of the drug
   c. Amount of the dose
   d. Frequency of the dose
   e. Expiration date
   f. All of the above

10. How long should the nurse teach the patient to take to inject the content of the medication in the syringe?
    a. 1 minute
    b. 2 minutes
    c. 30 seconds
    d. 3-5 minutes

11. How many times should the nurse teach the patient/family to flush the VAD during each administration of medication?
    a. one time
    b. two times
    c. three times