Improving Nursing Knowledge and Self-Efficacy in the Administration of Intravenous Prostacyclins

Lori Reyes, MSN, ANP-BC

Johns Hopkins School of Nursing

Project Advisor: Jaime McDermott, DNP
Organizational Mentor: Alison Davidson, DNP, FNP-BC, PCCN
Date of Submission: April 19, 2023
Table of Contents

Abstract ..................................................................................................................................

Introduction ...........................................................................................................................

Background ......................................................................................................................

Problem Statement ...........................................................................................................

Purpose .............................................................................................................................

Project Aims....................................................................................................................

Review of the Literature (related to evidence based practice/s to address the problem).......

Theoretical Framework/Evidence Based Practice Model..................................................

Methods..........................................................................................................................

Design ..............................................................................................................................

Setting .............................................................................................................................

Sample.............................................................................................................................

  Inclusion/Exclusion Criteria .............................................................................................

Recruitment ....................................................................................................................

Instruments/Measures .....................................................................................................

Intervention .....................................................................................................................

Procedures .....................................................................................................................

Ethical Review ................................................................................................................

Data Analysis ..................................................................................................................

Results ............................................................................................................................

Interpretation/Discussion ...............................................................................................  

Conclusion .......................................................................................................................  

Dissemination ..................................................................................................................  

This template is a guide to writing a DNP scholarly paper in APA Style, 7th edition. It provides the necessary sections, headings, and subheadings required in a proposal, as well as the line and paragraph spacing, page breaks, page numbering, and referencing styles. It is formatted with one inch top, bottom, left, and right margins; Times New Roman font in 12 point; double-spaced; aligned left; and paragraphs indented 5-7 spaces. The page number appears one inch from the right edge on the first line of each page. APA 7th Edition allows one or two spaces between each sentence. For more information about APA Style, see the *Publication Manual of the American Psychological Association (7th ed.)*, the APA Style web site: [http://www.apastyle.org](http://www.apastyle.org), and Purdue Owl Writing Center website: [http://owl.english.purdue.edu/owl/resource/560/01/](http://owl.english.purdue.edu/owl/resource/560/01/).
Abstract

**Background and Purpose:** Management of intravenous (IV) prostacyclin administration in the inpatient setting introduces significant challenges. Intravenous prostacyclins are high-risk, low frequency medications that pose a significant risk to patient safety if used in error. A lack of standardized procedures and education related to the nursing administration of IV prostacyclins has led to a knowledge gap amongst nurses responsible for its infusion. The purpose of this quality improvement project was to implement an educational intervention to improve nursing knowledge and self-efficacy with the administration of IV prostacyclins.

**Methods:** A convenience sample of registered nurses (n=21) from a medical intensive care unit of a teaching hospital was used. The project utilized a one-group pre- and post-survey design that compared nursing knowledge and self-efficacy at baseline and post-intervention. Satisfaction with the intervention was also assessed. The intervention was a 30-minute online module incorporating didactic and audio-visual modes of instruction. Optional teach-back sessions were also provided.

**Results:** The effectiveness of the educational intervention was statistically significant for improved nursing knowledge ($p < .01$), cognitive self-efficacy ($p < .01$) and psychomotor self-efficacy ($p < .05$). Affective self-efficacy was not statistically significant. There were no significant differences in knowledge or all self-efficacy domains for participants who attended the optional teach-back session. Participants overwhelmingly reported satisfaction with its accessibility, appropriateness for level of experience, and improved knowledge from training.

**Conclusions:** The findings suggest that the implementation of an online educational module is an effective training strategy to improve nursing knowledge and self-efficacy with parental prostacyclin administration.

**Implications:** Online didactic and audio-visual methods of instruction are an effective way to impact nursing knowledge and self-efficacy with IV medication management.

*Keywords: Intravenous prostacyclin, pulmonary arterial hypertension, nursing knowledge, quality improvement, patient safety*
Improving Nursing Knowledge and Self-Efficacy in the Administration of Intravenous Prostacyclins

**Introduction**

Pulmonary Arterial Hypertension (PAH) is a rare, disabling disease characterized by elevated pulmonary artery pressure and increased vascular resistance frequently leading to right-sided heart failure and death (Kingman & Lombardi, 2014). If left untreated, PAH has a mean survival rate of 2.8 years (Leeper & Powell, 2019). Patients diagnosed with PAH exhibit symptoms associated with cardiac dysfunction including shortness of breath, fluid accumulation, and exercise intolerance (Leeper & Powell, 2019). Despite the aggressive nature and poor prognosis of PAH, significant medical advances have been made with the introduction of intravenous (IV) epoprostenol in the mid-1990s, slowing progression and improving prognosis.

**Background**

Nurses play a critical role in the medication process, as they are primarily responsible for the safe administration of prescribed therapies (Cajanding, 2017; Coons et al., 2013). The Institute for Safe Medication Practices (ISMP) has identified epoprostenol and other prostanoid therapies, as high-alert medications. High-alert medications, such as IV epoprostenol, are of particular concern to nurses, as they pose a significant risk to patient safety if used in error (Cajanding, 2017; Engels & Ciarkowski, 2015). As a specialty disease, PAH patients admitted to inpatient settings are often prescribed multiple medications rarely seen in critical care settings (Smith et al., 2015). This warrants the need for nurse awareness, as well as methods to mitigate harm to prevent error (Cajanding, 2017).
In 2010, the Prostacyclin Safety Group released the results of an electronic survey of PAH centers in the United States. The results of the survey revealed serious or potentially serious errors reported by 68% of respondents. Twenty-nine percent of errors reported led to a serious adverse event, including nine deaths (Kingman et al., 2010). Several nursing issues were identified as contributors to these events including line management deficits, inappropriate rate setting, and incorrect patient dosing weights (Kingman et al., 2010). Additionally, there are no specific guidelines established for the administration of IV prostacyclins with adult PAH patients, leaving individual institutions responsible for the development of policy and comprehensive training to nursing staff caring for this population (Kingman & Chin, 2013; McLaughlin & Pavlesky, 2013).

**Significance of the Problem**

Globally, PAH ranges from 2.0 to 7.6 cases per million adults per year, with a prevalence varying from 11 to 26 cases per million adults (Thenappan et al., 2018). The rate of PAH is four times higher in women than men, however, males have poorer survival rates overall (Thenappan et al., 2018). The prevalence of PAH in the United States is estimated at 109 per million individuals (PMI) among adults under age 65, and 451 PMI among those 65 and older (Kirson et al., 2011). Prevalence rates in the Unites States tend to be higher than those globally. These variations are attributed to a variety of causes. A reclassification of PAH data after 2003 may have led to greater disease awareness and increased accuracy with diagnosis (Thenappan et al., 2018). In addition, an improvement in diagnostic and treatment capabilities and variations in registry-based studies that focuses on patient treatment in specialized centers often excludes
undiagnosed patients in earlier stages of the disease (Thenappan et al., 2018). Similar to
global rates, the prevalence of PAH in the United States tends to increase with age and is
higher amongst women (Kirson et al., 2011). With advances in medical therapy, there is a
growing focus on the improvement of the care of PAH patients (Gin-Sing, 2010; Leeper &
Powell, 2019; Stewart, 2016).

The local significance highlights specific medication safety issues with regards to
nursing administration. In a personal conversation with the medication safety officer at a
Northeastern hospital in the United States, two sentinel events occurred in the late 1990s
with patients receiving IV prostacyclin therapy (S. Muller, personal communication, July
9, 2021). In response to those events, a policy for the administration of IV prostacyclins
was developed and implemented. In 2017, an educational module covering pulmonary
hypertension disease state management of IV prostacyclins was introduced in response to
an increase in PH-related admissions (S. Muller, personal communication, July 9, 2021).
Additional personal communications with the medication safety officer, as well as with
the nurse manager of the Medical Intensive Care Unit (MICU) revealed a lack of
adherence to the institutional policy (S. Muller, personal communication, July 9, 2021; C.
Davis, personal communication, June 6, 2021), as well as a lack of standardization of the
educational module on PAH management (C. Davis, personal communication, June 6,
2021). The lack of standardization of policy and education has resulted in the nursing
staff being ill-prepared to manage PAH patients, specifically those on IV prostacyclin
therapies.

**Problem Statement**

PAH is a rare disease with a low incidence of hospitalized patients at any given
time (Beachem & Litton, 2014). The lack of standardized procedures and education related to the nursing administration of IV prostacyclins, coupled with infrequent hospital admissions, has led to a knowledge gap amongst nurses providing care to this population. To maintain safety for this population treated with a low-frequency, high-alert medication, it is essential to develop interventions that improve nursing knowledge and self-efficacy with the administration of IV prostacyclin therapies.

**Purpose**

The purpose of this evidence-based, quality improvement project is to develop, implement, and evaluate the effects of an IV prostacyclin education intervention on critical care nursing knowledge and self-efficacy with the administration of IV prostacyclin therapies while caring for patients diagnosed with PAH.

**Project Aims**

The three aims of this 12-week project are to:

1. Increase critical care nursing knowledge of IV prostacyclin administration by 20% using an educational intervention over a 12-week period and measured via a modified Nurses’ Knowledge of High Alert Medications instrument.

2. Increase critical care nursing self-efficacy of IV prostacyclin administration by 20% using an educational intervention over a 12-week period and measured via a modified Learning Self-Efficacy scale (L-SES) for clinical skills.

3. As a post-project variable, evaluate the satisfaction level of nurses of the IV prostacyclin educational intervention as part of a continuing education program as measured by a self-developed satisfaction survey.
Review of the Literature

Several safety aspects related to the infusion of IV prostacyclin therapies were identified in the literature. Evidence highlighted a universal recommendation for the implementation of regular, comprehensive nursing education for nurses administering IV prostacyclins (Doyle-Cox & McDiarmid, 2016; Kingman & Chin, 2013; Kingman & Lombardi, 2014; Kingman et al., 2010). While no specific method of instruction was recommended and with no standardized IV prostacyclin management knowledge test in existence, short-term educational programs related to disease state and medication management were identified as crucial topics of instruction (Doyle-Cox & McDiarmid, 2016; Kingman & Chin, 2013; Kingman & Lombardi, 2014; Kingman et al., 2010; Widlitz et al, 2007). Critical topics identified by leading PAH experts in the literature included (a) nursing knowledge of side effects (SEs); (b) order verification protocols; and (c) prostacyclin-specific competencies with infusion management.

Identification of SEs during the course of treatment and knowledge of SEs in relation to dosing/under-administration/over-administration (Doyle-Cox & McDiarmid, 2016; Kingman & Chin, 2013; Kingman & Lombardi, 2014; Widlitz et al, 2007) were almost universally acknowledged as integral to an educational intervention. Side effect management was also identified for the purpose of educating patients and improving adherence to the medication regimen (Kingman & Chin, 2013; Kingman & Lombardi, 2014; Widlitz et al., 2007). For order verification protocols, the implementation of a “two-nurse check” at initiation, dosage changes, concentration changes, and hanging of new IV bags was recommended (Doyle-Cox & McDiarmid, 2016; Kingman & Chin, 2013; Kingman & Lombardi, 2014, Kingman et al., 2010). Medication reconciliation at
transition points via the use of checklists were also important safety measures requiring nursing knowledge (Doyle-Cox & McDiarmid, 2016, Kingman & Chin, 2013; Kingman & Lombardi, 2014; Kingman et al., 2010). Specific to prostacyclin infusions, competencies detailing catheter/IV line set-up and care, the verification of catheter patency and the calculation of re-priming values given the narrow therapeutic dosages were emphasized (Doyle-Cox & McDiarmid, 2016; Kingman & Chin, 2013; Widlitz et al., 2007).

The evidence outlines key components of IV prostacyclin knowledge and skills recommended for the safe management of patients on these therapies. Taken together, they form the basis of the modules and videos that constitute the intervention of this quality improvement project.

**Theoretical Framework**

The Promoting Action on Research Implementation in Health Services (PARiHS) framework served as the guiding theoretical framework for this DNP scholarly project (see Appendix A). The PARiHS framework was utilized as it is multidimensional and provides a blueprint of necessary factors to consider during implementation of evidence into practice (Brown & McCormack, 2005). Three key elements form the foundation of the PARiHS framework and include evidence, context, and facilitation. “Evidence” for this project focused on an identified clinical problem in the MICU, specifically, a knowledge gap of IV prostacyclin administration amongst MICU nurses and a lack of standardized IV prostacyclin education. A subsequent literature review for potential solutions was conducted in 2021 with the results translated into the development of an IV prostacyclin administration bundle to improve nursing knowledge and self-efficacy.
“Context” was critical to successful knowledge implementation in the PARiHS framework, referencing a shared understanding of the benefits, risks and advantages of knowledge implementation (Kitson et al., 2008). The overall “context” in this project included all stakeholders and was further separated into three sub-elements. The first sub-element was the unit culture of the nurses. The nursing culture was evaluated at various stages throughout implementation via huddles and staff meetings, as it was imperative to gain staff acceptance and understanding of the project. The second sub-element consisted of leadership involvement at both the unit and hospital administration levels. This sub-element consisted of the decision-making processes that occurred during project implementation. Project implementation was primarily involved with unit-based leadership, working closely with the Nurse Manager and Assistant Nurse Manager and coordinated via frequent in-person meetings, staff huddles, and emails. Finally, ongoing evaluation occurred throughout implementation, ensuring promotion of the project, encouragement to complete the modules, as well as assistance with any technical issues that arose.

The final element, “facilitation,” is central to the PARiHS framework, and refers to “a technique by which one person makes things easier for others” (Kitson et al., 2008, p. 9). External facilitation of this element occurred via project support from nursing leadership, the project advisor, project mentor, and nurse educator. Internal facilitation was conducted by the DNP student who was responsible for primary project management throughout implementation.

Given the multiple elements at the project site, the PARiHS framework provided an accurate demonstration of the implementation of this project. Taken together, the three
elements were arranged on a continuum, ranging from low to high in relation to the likelihood of successful implementation. As demonstrated, successful implementation of this project was directly related to strong evidence, context and facilitation.

Methods

Project Design and Setting

This QI project utilized a one-group pre/post-test quasi-experimental intervention design to determine the effect of an evidence-based IV prostacyclin education intervention on nursing knowledge and self-efficacy with the administration of IV prostacyclins. The QI project was conducted at a 1,141 bed, magnet-recognized, not-for-profit hospital in an urban, mid-Atlantic academic medical center. Implementation took place in a fourteen bed MICU, one of two primary critical care units that admits patients initiated on parenteral prostacyclin therapies, cares for re-admissions requiring uptitration of therapy, or manages transitions to alternative IV prostacyclins.

Sample

A convenience sample of registered nurses, consisting of full-time, part-time, and per diem staff working in the MICU and who completed the critical care orientation with the medical institution were eligible to participate. A power analysis using a dependent t-test with a moderate effect (0.5) and alpha at 0.05, and beta at 0.80, showed a sample size of 34 participants was needed. Exclusion criteria included traveler nurses as they were not required to complete the critical care orientation. Potential participants were recruited via email and verbally through the Project Manager, Assistant Nurse Manager, and Nurse Manager during staff huddles at day and evening shifts.
Instruments/Measures

*Participant Demographics* included the following questions: years of experience, shift worked, and employment status.

*Knowledge:* Baseline and post-intervention knowledge levels were measured using a modified version of the Nurses’ Knowledge of High-Alert Medications instrument (Appendix C) developed by Hsaio et al. (2009). Given there is no assessment tool that measures nursing knowledge of IV prostacyclin therapies and that epoprostenol is identified as a specialty, high-alert medication, the use of the Nurses’ Knowledge of High-Alert Medications instrument was the most appropriate option to utilize as the basis for assessing knowledge. The original instrument consisted of a 20-item true/false questionnaire that assessed knowledge facts about drug administration and drug regulation. Content validity was obtained via the examination by seven experts, with a content validity index (CVI) of 0.92, indicating appropriate questioning. Construct validity was obtained in the first pilot study via a contrasted-groups approach. Finally, face validity was obtained during a second pilot study via snowball sampling examining three aspects of the study design. Reliability, was obtained during the second pilot study with a Cronbach’s alpha of 0.74 demonstrating acceptable reliability. During the second pilot study, inter-rater reliability was achieved with two independent researchers reaching a results agreement of 93.4%.

Modification of the original instrument covered major learning assessment themes related to drug administration and drug regulation including side effects of prostacyclins, worsening signs/symptoms of PAH disease, signs of under/over administration of prostacyclins, calculation of re-priming values and techniques of IV-line set-up and
verification of catheter patency, as these topics are identified in the literature. In line with the original instrument, five points were given for each correct answer with a total possible score of 100. Higher scores indicate more knowledge. Content validity was established with two experts in the field. The original authors of this instrument granted permission to use and modify the instrument as detailed in an email correspondence found in Appendix D.

**Self-Efficacy:** Assessment of nurse self-efficacy of IV prostacyclin administration was measured pre-test and post-test using a modified Learning Self-Efficacy Scale (L-SES) for Clinical Skills (Appendix E) (Kang et al., 2019). This self-efficacy scale was selected for use as it is specifically designed to measure self-efficacy with clinical skills, which was integral to the current project. Furthermore, the authors of the L-SES created an instrument that readily allowed for the modification of the instrument. The L-SES is a reliable and valid instrument consisting of 12 questions measuring self-efficacy with clinical skills. The survey was developed using Bloom’s taxonomy of learning objectives as a framework, with the final version consisting of three skill domains (cognitive, affective, and psychomotor; 4 questions per domain). The CVI of the L-SES was > 0.80 demonstrating good content validity. The Cronbach’s alpha was 0.931 indicating good reliability and some redundancy with questions. The original items were written such that users can replace the quoted phrase “clinical skill” with a target skill, such as “Verifying Catheter Patency and Re-instillation Volume”. Response options range from Disagree (1) to Agree (5) and items are summed in each domain. The original authors of this instrument granted permission to use and modify the instrument as detailed in an email correspondence found in Appendix F.
**Evaluation:** Satisfaction scores were obtained post-intervention from the administration of a self-developed satisfaction tool (Appendix G). The satisfaction scale consisted of five questions and Likert-type scale with responses ranging from strongly disagree (1) to strongly agree (5). The last question on the satisfaction survey was open-ended, and asked participants to provide their thoughts about the intervention.

**Intervention**

The intervention for this QI project included an evidence-based, self-paced online learning educational intervention comprised of three didactic, audio-visual presentation modules delivered via power point along with two instructional videos (described below). The intervention duration was a total of approximately 30 minutes. At the request of the MICU Nurse Manager, teach-back sessions were provided as a voluntary session to any participant who wished to review the skills demonstrated in the instructional videos. The educational modules and instructional videos were housed on an independent web-portal hosted by Weebly and accessed via a link or scannable QR code provided at the end of the pre-test (Appendix H).

**Modules.** The first module provided a definition and background to PAH, established clinical classifications, outlined hemodynamic requirements, identified associated conditions, and reviewed current diagnostics. The second module focused on the pathophysiologic mechanisms and progression of PAH, reviewed signs and symptoms of the disease, explained the World Health Organization (WHO) Functional Classification System, and introduced the role of IV prostacyclins as a treatment. The final module focused on IV prostacyclin management. Topics included clinical
recommendations, a review of IV prostacyclin formulations, and a discussion on nursing considerations during infusion.

**Videos.** The first instructional video provided a review of IV line set-up for IV prostacyclin infusions, focusing on the Five Rights of Medication Administration, IV line priming, techniques to prevent over-administration of drug, and a review of signs and symptoms of over-administration of drug. The second video reviewed and instructed on infusion techniques specific to IV prostacyclins including verification of catheter patency, calculating the dwell volume and re-priming values, and the re-instillation process of new concentrations into the central venous access device (CVAD).

**Teach Backs.** A total of five teach back sessions were offered between day and night shifts. Registered nurses who participated were asked to remove their work badges to prevent identification by name and were instructed to sign-in with their unique identifier. Participants were provided with the supplies necessary for an IV line set-up for prostacyclin therapy and asked to demonstrate proper set-up. In addition, participants were asked to identify the Five Rights of Medication Administration, and signs and symptoms of over- and under-administration. In the second portion of the teach-back, participants were provided with a scenario with an initiation of IV prostacyclin, and were asked to demonstrate verification of catheter patency, calculation of dwell volume and re-instillation volume, and finally demonstrate how to perform these procedures.

**Data Collection and Procedures**

Pre- and post-test surveys were administered between early October and late November 2022 via Qualtrics, a web-based survey software program. Participants were sent a recruitment email that contained a web link and QR code to the pre-test survey and
intervention website as well as the post-test survey, approximately two weeks later. Optional teach back sessions occurred after all participants completed the pre-test and before the post-test was released. The post-tests were available for a three week period, with the close of the project on November 28, 2022. To match the pre- and post-tests, participants were first asked to generate their own unique identifier, which was a combination of the first two letters of their middle name (if none, used “NA”), birth month (i.e., April =04), and the year graduated from high school. No personal or organizational identifiers were collected at any time.

Upon completion of both surveys, data were downloaded from Qualtrics and imported into the Statistical Package for the Social Sciences software (SPSS), Version 28 (IBM Corporation, 2022) for data cleaning and analysis. All data were maintained on an SPSS file on a password-protected computer. The Johns Hopkins One Drive was used to store all project-related materials. Collected data will be stored up to three years after the completion of data collection and analysis. The HIPAA compliance policy was followed.

Ethical Review

An ethical approval for this QI project was received from Johns Hopkins Project Ethical Review Committee (PERC #313). An institutional approval from NPAC was also granted on September 28, 2022. The approval addendum to include teach-backs was obtained on October 28, 2022.

Data Analysis

All data were analyzed with Social Sciences software (SPSS), Version 28 (IBM Corporation, 2022). Only participants with matched pre- and post-test data were included in the analysis. There was no missing data. Descriptive statistics were used to analyze
categorical participant demographics that included employment status, shift worked, years of experience, and attendance at teach-back (Appendix I). Data for Aim 1 (knowledge of IV prostacyclin administration) and Aim 2 (self-efficacy) did not meet normality assumptions; therefore, both aims utilized a two-tailed Wilcoxon-Signed Rank with alpha at 0.05. Descriptive statistics determined the percent change in knowledge and self-efficacy after the intervention. Finally, Aim 3, which focused on satisfaction with the educational intervention at post-test, was analyzed with descriptive statistics (frequency/percent, mean/standard deviation, median/interquartile range). Qualitative content analysis was used to develop themes from the open-ended question in the satisfaction survey.

Results

Participant Demographics

The final sample consisted of a total of 21 participants. Twenty were registered nurses and one was a per diem registered nurse, with 95% employed full-time. Rates for day shift vs night shift were similar, 57% and 43% respectively. Nearly 90% of the sample had greater than two years of experience. See Table 1 in Appendix J for sample characteristics.

[INSERT TABLE 1 HERE]

Aim 1: Knowledge

Table 2 (Appendix K) shows the knowledge results. Matched pre- and post-test data was obtained from all 21 participants. The pre-test knowledge median score was 90 ($IQR = 5$) and the post-test median score was 95 ($IQR = 5$), representing a 15-point increase in the post-test (an 18.75% change increase). This change in knowledge was
statistically significant \((Z = -3.88, p < 0.01)\). The question that had the most incorrect responses were whether ice packs were not required with Flolan \((n = 5, 23.8\%)\) and whether Veletri and Flolan were interchangeable \((n = 4, 19\%)\). Participants consistently missed the question. There were no significant differences in knowledge for participants who attended the optional teach-back session.

**Aim 2: Self-efficacy**

Table 2 (Appendix L) shows the self-efficacy results. Median changes in cognitive self-efficacy and psychomotor self-efficacy were both statistically significant \((Z = -3.58, p < .01; Z = -2.5, p < .05, \text{ respectively})\); however, cognitive self-efficacy had a median increase of 2%; psychomotor did not change. Affective self-efficacy was not statistically significant \((Z = -1.88, p = .06)\). There were no significant differences in all self-efficacy domains for participants who attended the optional teach-back session.

**Aim 3: Satisfaction**

One hundred percent of the sample agreed or strongly agreed with all five satisfaction questions. See Appendix M. The sample overwhelmingly reported satisfaction with ease of access to the module. The question with the lowest strongly agree related to the comfort of administration with IV prostacyclins.

In regard to the open-ended question on suggestions for improvement, three themes emerged. The first theme was overall satisfaction with the module, website, and videos. The next theme related to the usefulness of the intervention. A participant stated, “This acted as a timely refresher,” and another participant said it was a “need[ed] refresher”. The final theme related to the pacing of the intervention; one participant felt “rushed,” and another participant recommended a quarterly review of the modules.
Discussion

Intravenous prostacyclin therapy administration introduces significant challenges with its management in an inpatient setting. To ensure patient safety, nurses must have considerable knowledge of the drug, as well as a high level of competency to manage all aspects of the infusion (Kingman & Lombardi, 2014). This QI project was initiated in order to improve nursing knowledge and self-efficacy with the administration of IV prostacyclins. Overall, study results showed that the implementation of an online, didactic educational intervention led to clinically significant increases in knowledge, as well as improvements within the cognitive domain of self-efficacy. Given the lack of standardized procedures and education related to the administration of this high-alert medication, (Kingman et al., 2010), these findings offer a blueprint to the development of an educational program that can close the knowledge and self-efficacy gap amongst nurses administering parenteral prostacyclins, as well as improving safety in its administration.

Gains in Nursing Knowledge

Nurses responsible for the care of patients with PAH must possess the knowledge to safely start and manage parenteral prostacyclin therapies, understand risk factors associated with prostacyclin infusions, and have the competency to minimize those risks (Stewart, 2016). Findings from this project demonstrated that the use of an online educational module for nurses administering IV prostacyclin therapies was effective. While there are known interventions that aim to increase nursing knowledge of parenteral prostacyclins, other educational studies on heart failure have demonstrated a similar effect. In a 2018 study, Sundel & Emerson surveyed 40 staff nurses in an ambulatory care
setting utilizing a pre-test/post-test design. A 20-minute, educational intervention was implemented that focused on pathophysiology of heart failure, risk factors, signs and symptoms of heart failure, diagnostic tests, medications, and self-care principles. Post-intervention, the knowledge score increased by 18.2%. In another educational intervention utilizing a pre-test/post-test study design with a convenience sample of 61 community health nurse participants, Fowler (2012) increased knowledge scores from 80% pre-intervention to greater than 90% after the intervention.

**Implications for Enhancing Self-Efficacy**

The project did not demonstrate improvement within the affective construct of self-efficacy, nor were there any significant improvements in any of the domains with the addition of the teach-back sessions. A potential rationale for the lack of improvement within the affective construct may be attributed to the difficulties involved with the evaluation of the affective domain. Based on Blooms Theory, learning within the affective domain involves attitude, emotion, and beliefs, with role modelling identified as the most common educational strategy use in instruction (Britiller et al., 2014). Evaluation of this domain is more difficult versus that of the cognitive or psychomotor domains primarily because the attitudes and emotions experienced by the learner are not visibly observable (Britiller et al., 2014).

In contrast, the project did demonstrate that the online educational intervention improved nurses’ confidence in recalling how to perform specific tasks with IV management of parenteral prostacyclins, specifically, with verbalizing how to perform checks with catheter patency, the process involving calculation of indwelling volume, and recalling how to re-instill new volumes into the CVAD. Interestingly, the educational
intervention was equally confidence-building for the MICU nurses with performing the psychomotor skills necessary to assess and monitor catheter-related issues. These findings are similar to other educational interventions where online instruction led to improved psychomotor skills and confidence (McDonough et al., 2016) and in those where a combination of video instruction and didactic lecture improved knowledge and self-efficacy (Moon & Hyun, 2019).

**Recommendations**

While participants in this project significantly improved their knowledge scores, future research is needed to validate the IV prostacyclin knowledge questionnaire. With no known knowledge test to assess nursing knowledge of prostacyclin therapies, the need to generate quality data starts with high levels of validity and reliability (Bopararai et al., 2018). Without this necessary first step, future researchers may find it difficult to disseminate important results in quality journals.

The findings demonstrate high acceptability of the online training, with overwhelming support of its accessibility, appropriateness for level of experience, and improved knowledge from training. Results of this project suggest the training videos can be administered to a wider audience and at more frequently intervals as suggested in the open-ended responses. The implementation of an alternative educational intervention, particularly one that would address all aspects of self-efficacy, as seen with the implementation of repeated simulations may be warranted (Al Gharibi et al., 2021). Another consideration would replicating the project in more than one setting, such as multiple units in the same hospital or within a hospital system. This step would yield a larger sample size leading to more generalizable results.
Limitations

The present project has some limitations which should be noted. First, the participants are a subsample of a small, convenience sample of registered nurses from one MICU setting. Thus, the results are only generalizable to this setting. Future studies should include sampling from larger groups, additional ICU settings where IV prostacyclins are administered, and across other healthcare institutions in order to improve generalization of the findings. Another limitation was that there were no existing measures to evaluate nurses’ knowledge of IV prostacyclin administration. Although the modified knowledge test used in the project was reviewed for content validity by PAH experts, the instrument lacks reliability and validity data. Validating the knowledge tool could strengthen the data interpretation and should be a priority for future projects. Finally, pre-test scores in knowledge and self-efficacy were already high with an 80% average score, making it difficult to achieve the goal of a 20% knowledge increase post-intervention. Regardless, it is noteworthy that knowledge scores still achieved statistically and clinically significant findings. Despite these limitations, the project findings still have value. The intervention offers a starting point for other institutions to begin development of an educational offering for their nurses who manage parenteral prostacyclins.

Conclusion

Nurses play an essential role in the care of PAH patients on IV prostacyclins. Although PAH is a rare disease with a low incidence of hospitalized patients (Beachem & Litton, 2014), it is imperative that nurses possess requisite knowledge and confidence administering this complex therapy to provide safe and effective care. The lack of standardized education and protocols surrounding the administration of IV prostacyclins
can lead to mismanagement, medication errors, and potentially death. Innovative and time-saving methods are needed, especially as PAH rates are expected to increase as the population of 65-year-olds gets larger. Low-frequency, high-alert medications like IV prostacyclins further underscores the need for standardized, annual nursing competencies regarding the management of this parenteral therapy. Findings from this project demonstrated that nurses who received an online educational training had statistically and clinically significant improvements in knowledge, cognitive, and psychomotor scores.

Dissemination

Plans to disseminate this project will occur at the unit, hospital, and national levels. Results will be presented to the MICU staff during a monthly staff meeting and shared with leadership for potential inclusion into yearly staff training. The results will also be distributed to hospital’s senior leadership where it will be reviewed as a potential for roll-out within the cardiac service line. On the national level, an abstract will be submitted to the Pulmonary Hypertension Professional Network for possible inclusion into the upcoming symposium in September, 2023. Finally, a manuscript will be submitted to Advances in Pulmonary Hypertension, Nurse Education in Practice, or Nurse Education Today for publication.

Sustainability

The results of this project offer long-term application and solutions for unit educators, hospital leadership, and organizational administrators. The clinically significant results coupled with the intervention’s ease of use and online accessibility make it an easy add-on component to most nursing education programs. The intervention could be
integrated into annual competency trainings for nursing staff or as an introduction for
newly hired nurses working with this population. Hospitals can embed the video training
into their policies/protocols webpage as a resource for nurses working with patients
receiving IV prostacyclin therapies. The intervention may also serve as a the basis for a
national protocol and/or training video as part of the online educational courses that the
Pulmonary Hypertension Association (PHA) offers to providers.
References


http://dx.doi.org/10.4037/ccn2013608


Appendix

(Align Appendices sequentially from first inclusion in narrative through last inclusion.

Start each new Appendix item on separate page in your actual work)
Appendix A

PARiHS Theoretical Framework

**CONTEXT**
- Stakeholders
  - Unit Culture of RNs (acceptance of Project)
  - Leadership involvement
    - RN Manager/Asst. RN Manager
    - MD Leadership
    - Nursing Administrative Support

**EVIDENCE**
- Identified clinical problem in MICU setting
- Knowledge gap of IV prostacyclin administration amongst MICU nurses
- Lack of standardized IV prostacyclin education

**FACILITATION**
- Literature Review on IV prostacyclin administration
- IV Prostacyclin Administration Bundle to improve Nursing Knowledge
- IV Prostacyclin Administration Bundle to improve Nursing Self-Efficacy with IV prostacyclin administration

**EVIDENCE**
- Identified clinical problem in MICU setting
- Knowledge gap of IV prostacyclin administration amongst MICU nurses
- Lack of standardized IV prostacyclin education

**Interventions**
- Literature Review on IV prostacyclin administration
- IV Prostacyclin Administration Bundle to improve Nursing Knowledge
- IV Prostacyclin Administration Bundle to improve Nursing Self-Efficacy with IV prostacyclin administration

**FACILITATION**
- **Internal Facilitator:** Project Management; DNP student
- **External Facilitator:** Nurse Educator; Project Mentor; MD Mentor; Project Advisor; Nurse Manager; Asst Nurse Manager
Appendix B

Timeline

Table 1

*Simplified Project Timeline* (yours will have more Task Headers and will be more detailed)

<table>
<thead>
<tr>
<th>Task</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment of eligible participants</td>
<td>X</td>
<td>continued</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention; Evaluation; Toolkit</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test and Analysis of outcomes</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Results presented to local providers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
## Appendix C

### Nurses’ Knowledge Tool - Modified Nurses’ Knowledge of High-Alert Medications

<table>
<thead>
<tr>
<th>Item</th>
<th>Question</th>
<th>Answer (T/F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IV prostacyclins are dosed in ng/kg/min</td>
<td>T</td>
</tr>
<tr>
<td>2.</td>
<td>Dose adjustments of IV prostacyclins are based on clinical response, SEs, and symptoms</td>
<td>T</td>
</tr>
<tr>
<td>3.</td>
<td>IV prostacyclin dosing weights should be adjusted daily</td>
<td>F</td>
</tr>
<tr>
<td>4.</td>
<td>IV line/port can be used for blood withdrawal</td>
<td>F</td>
</tr>
<tr>
<td>5.</td>
<td>IV prostacyclins can infuse with other fluids</td>
<td>F</td>
</tr>
<tr>
<td>6.</td>
<td>Veletri and Flolan are the same drug and are interchangeable</td>
<td>F</td>
</tr>
<tr>
<td>7.</td>
<td>The half-life for Flolan (epoprostenol) is 4-6 minutes</td>
<td>T</td>
</tr>
<tr>
<td>8.</td>
<td>The indwelling volume should be multiplied by 0.8 to obtain re-priming volume</td>
<td>T</td>
</tr>
<tr>
<td>9.</td>
<td>10 ng/kg/min is a common starting dose of IV prostacyclins</td>
<td>F</td>
</tr>
<tr>
<td>10.</td>
<td>If a patient on IV prostacyclin becomes hypotensive, I should immediately stop the infusion</td>
<td>F</td>
</tr>
<tr>
<td>11.</td>
<td>Intravenous Flolan does not require ice packs during administration.</td>
<td>F</td>
</tr>
<tr>
<td>12.</td>
<td>SOB, chest pain, palpitations are signs of under administration of IV prostacyclins</td>
<td>T</td>
</tr>
<tr>
<td>13.</td>
<td>Concentration changes of IV prostacyclins do not require re-priming of the CVC</td>
<td>F</td>
</tr>
<tr>
<td>14.</td>
<td>Jaw pain, flushing, and lower extremity pain are common side effects of IV prostacyclins</td>
<td>T</td>
</tr>
<tr>
<td>15.</td>
<td>Rebound pulmonary hypertension is lethal and may occur with sudden discontinuation of IV prostacyclin</td>
<td>T</td>
</tr>
<tr>
<td>16.</td>
<td>The back-up bag of IV prostacyclin should always be kept at patient bedside</td>
<td>F</td>
</tr>
<tr>
<td>17.</td>
<td>Two-RN verification is recommended for IV prostacyclin initiations, dosage changes, and concentration changes</td>
<td>T</td>
</tr>
<tr>
<td>18.</td>
<td>Sudden facial flushing, headache, and hypotension are signs of over-administration of IV prostacyclins</td>
<td>T</td>
</tr>
<tr>
<td>19.</td>
<td>IV Remodulin has a half-life of 4 minutes</td>
<td>F</td>
</tr>
<tr>
<td>20.</td>
<td>IV prostacyclins are potent vasoconstrictors</td>
<td>F</td>
</tr>
</tbody>
</table>
Appendix D

Permission to Use/Modify Nurses’ Knowledge of High-Alert Medication Tool

4/29/22, 12:50 AM
https://outlook.office.com/mail/inbox/id/AAQkAGRhNjgzNjIxLTIwNzYtNGI1Zi1hMT E3LWY5TkyYjRmNjE5OAAQAMCHMjrviyxDgE5sMsS1f3A%3D Page 1 of 2
Re: Use of Nurses' Knowledge of High Alert Medications Instrument
fuintang@gmail.com
Fri 4/22/2022 12:58 AM
To: Lori Reyes <lreyes9@jhmi.edu>
External Email - Use Caution
Dear Lori,
Sorry for the late reply. I am already retired from YMU two years ago and don’t read my email frequently. Thank you for interested in this topic. Of course you can use the instrument for your study. Also, the tables in my article are equal to the contents of my questionnaires. You could use the tables and modify that. Hope this information helps.
Good luck and I wish you all the best.
Warm regards
Fu-In Tang

Lori Reyes <lreyes9@jhmi.edu> 於 2022年4月19日 上午6:00 寫道：

Good afternoon Dr. Tang,
My name is Lori Reyes and I am a working on my doctoral studies for Nursing at the Johns Hopkins School of Nursing. My project is "Improving Nursing Knowledge and Self-Efficacy with the Administration of IV Prostacyclins in the Critical Setting." I would very much like to use and modify the Nurses' Knowledge of High Alert Medications Instrument for my project. Please let me know if you approve of me using this wonderful tool. I would of course submit my findings to you and credit you and your team with its use.
Sincerely,
Lori Reyes, ANP-BC
Nurse Practitioner
DNP Student at Johns Hopkins School of Nursing
## Appendix E

### Nurses’ Self-Efficacy Tool - Modified Learning Self-Efficacy Scale for Clinical Skills

<table>
<thead>
<tr>
<th>Domain/No.</th>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I can recall how to perform catheter patency/re-instillation skill.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I understand the content of the catheter patency/re-instillation skill and can demonstrate it to others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I can verbally explain the purpose and principle of operating the catheter patency/re-instillation skill.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I can verbally explain the sequence and interrelationship between each step.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I think I spend more time on this skills course than others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I think I gain more in this skills course than in others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I tend to pay more attention to information related to this skills course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I tend to actively look for information related to this skills course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychomotor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I can precisely imitate the instructor’s steps and actions of the catheter patency/re-instillation skill.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I can smoothly complete the operation steps of the catheter patency/re-instillation skill.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I try to monitor my catheter patency/re-instillation skill for improvements.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I try to monitor my catheter patency/re-instillation skill operation and make proper adjustments as needed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mark:**
1=STRONGLY DISAGREE with the statement
2=DISAGREE with the statement
3=UNDECIDED you neither agree or disagree with the statement
4=AGREE with the statement
5=STRONGLY AGREE with the statement
Appendix F

Permission to Use/Modify L-SES

Re: Permission to Use and Modify L-SES
吳建志(TMU) <ccwu@tmu.edu.tw>
Thu 4/14/2022 10:15 AM
To: Lori Reyes <lreyes9@jhmi.edu>
1 attachments (16 KB)
self Learning efficacy scale (English version).docx;
External Email - Use Caution
Dear Lori Reyes:
Thank you for your E-mail.
Yes, it is our pleasure and happy to approve that you use and modify the learning self-efficacy scale (L-ESE) developed by our team for your doctoral studies. Attached please find the original version of the scale.
Best Regards
Chien-Chih Wu, MD, PhD
Professor and Chair
School of Medicine, College of Medicine
Taipei Medical University
Taipei, Taiwan
E-mail: ccwu@tmu.edu.tw

Lori Reyes <lreyes9@jhmi.edu> 於 2022年4月13日 週三 上午3:11寫道:
Good Afternoon Dr. Wu,
My name is Lori Reyes and I am a doctoral nursing student at Johns Hopkins University. I am working on a Quality Improvement Project as part of my doctoral studies. My topic is to Improve Nursing Knowledge and Self-Efficacy in the administration of Intravenous Prostacyclins, which includes a clinical skills portion as part of the self-efficacy portion. I am seeking permission to modify the L-SES for clinical skills as my instrument. May I have your permission to do this?
Sincerely,
Lori Reyes, ANP-BC
DNP student at Johns Hopkins School of Nursing
Appendix G

Educational Intervention Satisfaction Tool

Mark:
1=STRONGLY DISAGREE with the statement
2=DISAGREE with the statement
3=UNDECIDED you neither agree or disagree with the statement
4=AGREE with the statement
5=STRONGLY AGREE with the statement

<table>
<thead>
<tr>
<th>Satisfaction with Course</th>
<th>SD</th>
<th>D</th>
<th>UN</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It was easy to access this educational module.</td>
<td>( )1</td>
<td>( )2</td>
<td>( )3</td>
<td>( )4</td>
<td>( )5</td>
</tr>
<tr>
<td>2. This educational module was appropriate to my level of nursing experience.</td>
<td>( )1</td>
<td>( )2</td>
<td>( )3</td>
<td>( )4</td>
<td>( )5</td>
</tr>
<tr>
<td>3. As a result of this training, my knowledge of IV prostacyclin administration has improved.</td>
<td>( )1</td>
<td>( )2</td>
<td>( )3</td>
<td>( )4</td>
<td>( )5</td>
</tr>
<tr>
<td>4. As a result of this training, I am comfortable administering IV prostacyclin medications.</td>
<td>( )1</td>
<td>( )2</td>
<td>( )3</td>
<td>( )4</td>
<td>( )5</td>
</tr>
<tr>
<td>5. As a result of this training, I will utilize this information to support my practice with Pulmonary Hypertension patients.</td>
<td>( )1</td>
<td>( )1</td>
<td>( )3</td>
<td>( )4</td>
<td>( )5</td>
</tr>
<tr>
<td>6. Please tell me your thoughts about the intervention, ideas for improvement, etc.?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H

Web-Based Educational Intervention

www.PAHlearn.com
Appendix I

Demographical Information Survey

1. Employment Status
   [ ] Full-Time    [ ] Part-time    [ ] Per Diem

2. Shift Worked
   [ ] Day          [ ] Night

3. Years of Experience
   [ ] Less than 2 years
   [ ] 2-5 years
   [ ] 5-10 years
   [ ] >10 years

4. Attendance at Teach-back
   [ ] Yes          [ ] No
Appendix J

Results for Table 1

Table 1.
Baseline Characteristics of MICU Registered Nurse Participants (N=21)

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>N = 21 (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Status</td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>20 (95.2)</td>
</tr>
<tr>
<td>Per Diem</td>
<td>1 (4.8)</td>
</tr>
<tr>
<td>Shift Worked</td>
<td></td>
</tr>
<tr>
<td>Day</td>
<td>12 (57.1)</td>
</tr>
<tr>
<td>Night</td>
<td>9 (42.9)</td>
</tr>
<tr>
<td>Years of Experience</td>
<td></td>
</tr>
<tr>
<td>Less than 2 years</td>
<td>2 (9.5)</td>
</tr>
<tr>
<td>2-5 years</td>
<td>6 (28.6)</td>
</tr>
<tr>
<td>5-10 years</td>
<td>6 (28.6)</td>
</tr>
<tr>
<td>Greater than 10 years</td>
<td>7 (33.3)</td>
</tr>
<tr>
<td>Attended Teach-back</td>
<td>7 (33.3)</td>
</tr>
</tbody>
</table>
Appendix K

Results for Table 2

Table 2.
Nurse Survey Results for Aims 1 and 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-test Median (IQR)</th>
<th>Post-test Median (IQR)</th>
<th>t/Z</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim 1: Nurse Knowledge</strong></td>
<td>80 (5)</td>
<td>95 (5)</td>
<td>-3.88**</td>
</tr>
<tr>
<td><strong>Aim 2: Self-Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>15 (3)</td>
<td>18 (3)</td>
<td>-3.58**</td>
</tr>
<tr>
<td>Affective</td>
<td>14 (2.5)</td>
<td>14 (3)</td>
<td>-1.88</td>
</tr>
<tr>
<td>Psychomotor</td>
<td>16 (1)</td>
<td>16 (1.5)</td>
<td>-2.5*</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01
Appendix L

Results for Table 3

**Table 3.**

Satisfaction Question Results

<table>
<thead>
<tr>
<th>Question Text</th>
<th>N = 21 (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to access educational module</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>4 (19)</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>17 (81)</td>
</tr>
<tr>
<td>Appropriate for my nursing experience</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>7 (33.3)</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>14 (66.7)</td>
</tr>
<tr>
<td>Knowledge Improved from training</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>11 (52.4)</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>10 (47.6)</td>
</tr>
<tr>
<td>Comfortable with Administration</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>14 (66.7)</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>7 (33.3)</td>
</tr>
<tr>
<td>Utilize Information for Practice</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>12 (57.1)</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>9 (42.9)</td>
</tr>
</tbody>
</table>