

Increasing Nurse Competency with Sapphire™ Infusion System Patient-Controlled Analgesia Through a Unit-Based In-Service to Improve Effective Pain Management

Jessica Goldberg, RN, Jaspreet Kaur, RN, Sabrina Kwok, RN, Tair Melikov, RN, Priscila Page, RN, Gregory Punsalan, RN, Despina Vassiliadou, RN & Fanta Keita Zable, RN

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SBAR & PROBLEM STATEMENT

SITUATION	The hospital involved in this quality improvement project recently went through changes in the patient-controlled analgesia (PCA) pump equipment being used in its units, permanently replacing the Lifecare PCA™ Infusion System by the Sapphire™ Infusion System PCA pump to be used as part of their pain management care plans. Only a small portion of the staff was officially trained to use the Sapphire pump and these trainings were not mandatory. As a result, many Registered Nurses (RNs) have been programming the equipment without any prior training.
PROBLEM STATEMENT	Lack of experience and knowledge about the Sapphire pump, along with unstandardized education and competency checkoff, could potentially result in medication programming errors and inaccurate documentation of medication totals. This could lead to inaccurate pain management and represents a risk to patient safety.
BACKGROUND	PCA has been used for pain relief since 1971, with the first commercially available PCA pump appearing in 1976. PCA is used to treat acute, chronic, postsoperative, and labor pain, and can be administered intravenously, epidurally, through a peripheral nerve catheter, or transdermally. The effectiveness of PCA is in that it allows a patient to control their preferred dose and schedule of pain medication by administering a predetermined bolus dose on-demand at the press of a button. This enables patients to have more control over their own pain while also reducing nursing workload. PCA has been proven to be more effective at controlling pain levels than manual opioid injection, and has resulted in higher patient satisfaction scores (Pattino, 2018).
ASSESSMENT	An initial survey was implemented to assess nurses' levels of confidence with regard to the application of the Sapphire pump. A post-survey was conducted to determine the effectiveness of the Sapphire pump in-service training.
RECOMMENDATION	Implementation of standardized Sapphire pump in-service on a regular basis for safe medication administration.

PROJECT OVERVIEW

Implementation consisted of three parts:

1. An Initial survey was distributed throughout ten units across two hospital campuses to assess RNs' exposure/comfort level with the Sapphire pump. The minimum benchmark of 55% of each unit's staff (day/night shifts) was surveyed.
2. A standardized in-service education script was created to ensure proper Sapphire PCA use according to hospital competency standards. Hands-on in-service was provided on each unit until at least 35% of unit staff had received the education.
3. A post-in-service survey was distributed to assess the degree of improvement in nursing staff understanding/competency of Sapphire pump operation.

PROJECT TIMELINE

TASK/TITLE	START	END	DURATION										
	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13
Identification of Problem													
Initial Meeting with Stakeholders	1/29	1/29	1										
Development of Pre-Survey	1/30	2/3	3										
Staff Pre-Survey	2/5	2/12	7										
Project Definition and Planning													
Follow-up Meeting with Stakeholders	2/19	2/19	1										
Review of Literature	2/20	2/27	7										
Education Plan	2/20	2/26	6										
Project Implementation and Initiation													
Sapphire Pump Education Trainee	2/21	2/21	1										
Development of in-service	2/23	2/23	1										
Sapphire Pump In-service	3/1	3/7	7										
Sapphire Pump Post-Survey	3/1	3/7	7										
Updates to Video Script	4/4	4/7	4										
Film and Edit Educational Video	3/8	4/10	3										
Project Performance / Monitoring													
Data Analysis	3/17	3/20	4										
Sapphire Team Collaboration	3/17	4/21	35										
Meetings with Project Advisor	3/24	4/21	28										
Project Presentation Development	4/12	4/23	14										

METHODOLOGY

MICROSYSTEM ASSESSMENT

A microsystem assessment was completed in the Oncology Pulmonary Acute Care unit by examining the 5 P's: purpose, patients, professionals, processes, and patterns (King & Gerard, 2016).

ROOT CAUSE ANALYSIS

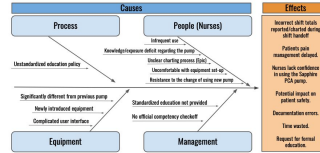


Figure 1. Fishbone diagram illustrating root cause analysis.

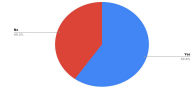
THEORETICAL FRAMEWORK

In order to create change, Lippitt's Phases of Change Theory was used as the theoretical framework for this in-service educational project. Lippitt's Phases of Change Theory has several phases: diagnose the problem, assess capacity for change, assess agent's motivation and resources, select progressive change objective, choose the appropriate role of the change agent, maintain change and terminate helping relationship (Lippitt, Watson, & Westley, 1953).

INITIAL SURVEY

- Campus-wide pre-survey included 286 participants.
- Results showed 40% had no exposure to the Sapphire pump.
- Pre-survey included multiple questions on levels of confidence of Sapphire pump operations using a scale from 1 (least) to 5 (most).
- Survey sought to determine the knowledge that nursing staff already possessed, any gaps in knowledge, and any additional concerns.

Figure 2. Self-reported nursing staff use of/ familiarity with the Sapphire PCA pump at Hospital A and B.



INTERVENTION

TOOLS

1. Standardized educational in-service script.
2. A video training for other units.
3. Sapphire PCA pump used for nurses to practice and demonstration.

INTRODUCTION TO LEARNING MATERIALS

Educators attended unit huddles to announce their presence on unit and rounded on nurses during their shift to make them aware the in-service was being provided.

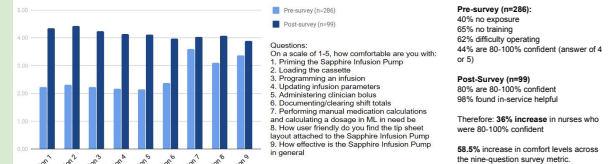
INSERVICE TRAINING

- Worked with nurses to run through scenarios.
- Guided nurses in programming and using PCA pump.
- Provided answers to common questions from responses from the pre-survey.
- Nurses had the opportunity to play around with the Sapphire PCA pump.
- Educators gave the opportunity for nurses to ask questions and get feedback.



RESULTS

Campus Wide Pre- and Post-Survey Averages



Pre-survey (n=286):
40% no exposure
65% no training
62% difficulty operating
44% are 80-100% confident (answer of 4 or 5)

Post-Survey (n=99)
80% are 80-100% confident
98% found in-service helpful

Therefore: **36% increase** in nurses who were 80-100% confident

58.5% increase in comfort levels across the nine-question survey metric.

DISCUSSION/LIMITATIONS

- COVID19 - no access to the facility, but provided a video training.
- Resistance to change by RNs.
- Time constraints - documentation/shift totals (8hr/12hr).
- Nurses not always available for in-service.
- Challenge in collecting pre/post surveys

CONCLUSION

- Sapphire pump in-service was well received. A total of 99 nurses were educated and trained.
- Prior to in-service, 44% of nurses were at least 80% confident in pump operations, compared to 79.6% after the in-service.
- Due to the limitations of the COVID-19 pandemic, a training video was created as supplemental education. However, no further assessment could be conducted due to suspension of on-site student activity.
- Quality improvement project was beneficial for both nurses and the educators due to a 58.5% increase in campus wide nine question survey metric.

FUTURE DIRECTIONS

- Future CNL students will continue in-service for units we were not able to complete and will continue to evaluate effectiveness of the intervention.
- Standardized Sapphire pump in-service will be conducted every 2 years.
- Campus wide success webinar by the nurse educator to motivate staff and maintain project momentum.
- Incorporate assessment surveys into an online format to continue to track progress.
- Create a Sapphire pump competency checkoff for units who most frequently receive patients with PCA.
- Evaluate improved patient outcomes, including decreased medication errors, improved pain management, and increased patient satisfaction.

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