Abstract accepted for Poster Presentation at the ANCC Nursing National Magnet Meeting, Denver, CO, October 2018 - Manuscript in preparation for publication.

A Comparison Timing Study – An Oral PCA Versus Traditional Delivery

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Purpose: A nurse timing study was designed to measure the nursing time for the delivery of a single dose of as needed (prn) oral pain medication using a wi-fi electronic patient controlled analgesia (PCA) device. A similar study was done to measure the time for the manual delivery of a dose of prn oral medication with the purpose of comparing the two times.

Background/Significance: As needed (prn) oral pain medication is part of multimodal pain management for surgical patients. Patients after total knee arthroplasty and total hip arthroplasty have reported better pain management using the oral PCA device compared to patients receiving the same medication by manual delivery. Surveys from nursing staff using the oral PCA device state that this technology saves them time. The hypothesis of this research timing study was that the use of the oral PCA device would take less nursing time for the delivery of a single dose of prn pain medication compared to manual delivery.

Methods: The time for each delivery process from start to finish was divided into specific tasks. No attempt was made to time each step sequentially but staff was encouraged to time steps that could be easily done during their shift time. Two personal data assistant (PDA) devices were programmed to collect data. A touch screen was created on the PCA devices with each described task step shown on labelled color boxes. The nurse touched the touchscreen box of that step when the step began and a stop icon when the task was finished. Seventeen nurses participated in data collection for multiple steps. All steps were analyzed for the mean, the standard deviation and the maximum and minimum step times. The means for all the steps for each process were summed to arrive at the nursing time for the delivery of a single dose of medication.

Results: Nursing time for the manual delivery of prn medication followed by a reassessment step was 12.7 minutes. Manual delivery began with the patient medication request and ended with pain reassessment. The oral PCA device steps included the acquisition of the eight-dose tray, loading and programming the device for patient use and removing the patient from the device. Since these steps could deliver eight doses of medication, the nursing time for each dose of medication delivered was 2.1 minutes. The device collected a reassessment pain score by an audio reminder to the patient to enter their pain score one hour after medication administration. Once the first medication tray is empty, reloading another medication tray is accomplished. The reloading steps required 40 seconds of nursing time per dose of medication delivered.

Conclusions and Implications for Practice : The oral PCA saved 84% of the time to deliver each dose of prn medication. In a 12-hour shift, three hours of nursing time would be used to manually deliver prn pain medication to five patients. The oral PCA device would require one half hour of nursing time. The adoption of new technology will save nursing time, increase efficiency and improve patient care.