

## Quality Improvement

# Scheduled Opioid Administration in Hospice Patients Before and After Targeted Caregiver Education

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## Abstract

### Background

Hospice and palliative care have been shown to increase patient satisfaction and improve symptom control at the end of life. Opioid analgesics are typically given around the clock at the end of life to maintain symptom control and prevent the need for larger doses later. Many hospice patients have some degree of cognitive impairment, putting them at risk of being undertreated for pain.

### Methods

This was a retrospective, quasi-experimental study at a 766-bed community hospital with hospice and palliative care services. Adult patients admitted to inpatient hospice care with active orders for scheduled opioids for at least 12 hours with at least 1 dose administered were included. The primary intervention was the creation and dissemination of education to non-intensive care nursing staff. The primary outcome was the administration rate of scheduled opioid analgesics to hospice patients before and after targeted caregiver education. Secondary outcomes included the rate of use of 1-time or as-needed opioids, the rate of use-of-reversal agents, and the impact of COVID-19 infection status on administration rates of scheduled opioids.

### Results

A total of 75 patients were included in the final analysis. The rate of missed doses was 5% in the pre-implementation cohort and 4% in the post-implementation cohort ( $P = .21$ ). The rate of delayed doses was 6% in the pre-implementation cohort and 6% in the post-implementation cohort ( $P = .97$ ). Secondary outcomes were similar between the two groups with the exception of a higher rate of delayed doses in patients with confirmed COVID-19 as compared to those without COVID-19 ( $P = .047$ ).

### Conclusion

The creation and dissemination of nursing education were not associated with a decrease in missed or delayed doses of scheduled opioids in hospice patients.

### Keywords

hospice; morphine; opioids; opioid analgesics; palliative care; analgesia; adherence; medication errors; nursing education research

### Background

In multiple clinical trials, hospice and palliative care have been shown to increase patient satisfaction and improve symptom control at the end of life.<sup>1</sup> Pain is a prevalent symptom at the end of life and is often considered one of the more treatable symptoms in palliative care.<sup>2</sup>

Opioid analgesics are typically given in palliative care around the clock to maintain symptom control and prevent the need for larger breakthrough doses.<sup>3,4</sup> Opioids can also be used off-label to alleviate air hunger, or the feeling of severe dyspnea, which is also common at the end of life.<sup>5</sup>

Many hospice patients have some degree of cognitive impairment, such as delirium, which increases the risk of being undertreated for pain. Some non-verbal signs and symptoms of pain that may be seen in those who cannot communicate include grimacing, tachycardia, tachypnea, and restlessness.<sup>2</sup> Many caregivers, including healthcare professionals, fear that scheduled opioid administration may contribute to an earlier death. However, evidence has shown palliative sedation with opioids and other medications does not hasten death.<sup>6</sup>

Anecdotally, missed and delayed doses of scheduled opioids in hospice patients can have detrimental effects on pain control, which is one of the most common reasons for inpatient hospice, as opposed to home hospice care.<sup>1</sup> We hypothesized high-quality, targeted education for nurses would decrease rates of missed and delayed doses of scheduled opioids in our inpatient hospice population.

## Methods

This was a single-center, retrospective, quasi-experimental study comparing outcomes before and after targeted nursing education at a 766-bed multi-campus community hospital.

The time period before implementation was July 1, 2021, to September 30, 2021, while the time period following implementation was December 13, 2021, to March 12, 2022. A time gap was allotted between the pre- and post-implementation periods to allow for practice adjustments after education. Patients were included if they were 18 years of age or older, were admitted to inpatient hospice, and had an active order for scheduled opioid analgesics for at least 12 hours with at least 1 dose administered. Exclusion criteria included death within 12 hours of hospice admission or an active order for patient-controlled analgesia (PCA). If patients had an active order for PCA for only a portion of their hospice admission and met all other criteria, the time that the PCA was not active was included for analysis.

For the nursing education intervention, pharmacists created a single-page, double-sided fact sheet (**Figure 1**). This tool was determined to be the optimal method of education by the health system in order to enhance learning, as surveys have shown that staff members prefer education that is quick and easy. A clinical nurse educator reviewed the content to ensure adherence with the preferred educational design, and the project was reviewed by the facility's

<b>EDUCATIONAL TOPIC : How to Treat Your Hospice Patient</b>	
<b>DESCRIPTION : Our Goal with Hospice Patients is Comfort</b>	
<ul style="list-style-type: none"> <li>Hospice Patients with Cognitive Impairment are at Risk of being Undertreated for Pain</li> <li>Grimacing, Tachycardia, Tachypnea or Restlessness are Signs of Pain for Those Who Cannot Communicate</li> </ul> <p>We Keep the Patient Comfortable by Giving Small Doses of Medications Around –The – Clock (ATC)</p> <ul style="list-style-type: none"> <li>Opioids like <b>Morphine</b> &amp; <b>Hydromorphone</b> are given ATC for Pain &amp; Air Hunger (feeling of severe dyspnea)</li> <li>You may also see orders for PRN doses for breakthrough</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <input type="checkbox"/> morphine Inj 10/14 1439              IV MG Q15MIN PRN PRN PAIN 4-10 &amp; Air Hunger if NPO  <input type="checkbox"/> morphine Inj 10/14 1439              IV 2 MG Q4H         </div> <ul style="list-style-type: none"> <li><b>Lorazepam</b> can also be used in Combination to help with Agitation, Anxiety, Pain, Nausea, &amp; Seizures</li> </ul>	
<b>BEST PRACTICE</b>	<p>Evidence Shows that ATC administration does NOT hasten death, but does improve patient comfort and family satisfaction.</p> <p>Moral of the Story: <b>Do Not Hold Scheduled ATC Medications!!!</b></p>

**Figure 1.** The fact sheet used for nurse education entitled “How to Treat Your Hospice Patient”. PRN indicates as-needed.

research review committee. Clinical nurse educators disseminated the physical fact sheets to nurses in non-intensive care units across 2 of the 3 health system campuses, as over 99% of inpatient hospice patients are cared for at these 2 campuses. The clinical nurse educators also verbally reviewed the content, which included risk factors for undertreating pain, common medication regimens used in hospice patients, and the preferred practice, which is to refrain from withholding scheduled medications without an order to do so. This education occurred from mid-October to early December of 2021.

Patients were identified for inclusion via the electronic medical record (EMR) based on a report of orders for at least 1 opioid analgesic ordered by a palliative care or hospice physician or advanced practice professional. Patients were included if they were identified as admitted for inpatient hospice care. This project was undertaken as a quality improvement project and as such did not need Institutional Review Board approval.

Data collection was performed by review of the EMR. The following information was collected for patients who met the prespecified inclusion criteria: age, sex, hospital unit, hospice length of stay, opioid medications ordered, number of scheduled opioid administrations, nursing and provider documentation within the electronic medical record, laboratory and microbiology results (including coronavirus disease 2019 [COVID-19] results and documentation), past medical history, allergies, and administration of opioid reversal agents. A patient was determined to be COVID-19 positive if they tested positive by means of a polymerase chain reaction test or SARS-CoV-2 antigen test or if documented as COVID-19 positive from an outside medical source.

The primary outcome was administration rates of scheduled opioids before and after nursing education. Missed doses were defined as any dose that was documented as not given in the EMR. Delayed doses were defined as any dose that was given more than 1 hour after the scheduled administration time. Doses that were neither missed nor delayed were considered as part of the primary outcome. Secondary outcomes included the rate of use of 1-time

or as-needed opioids, the rate of use of reversal agents, and the impact of COVID-19 infection status on administration rates of scheduled opioids.

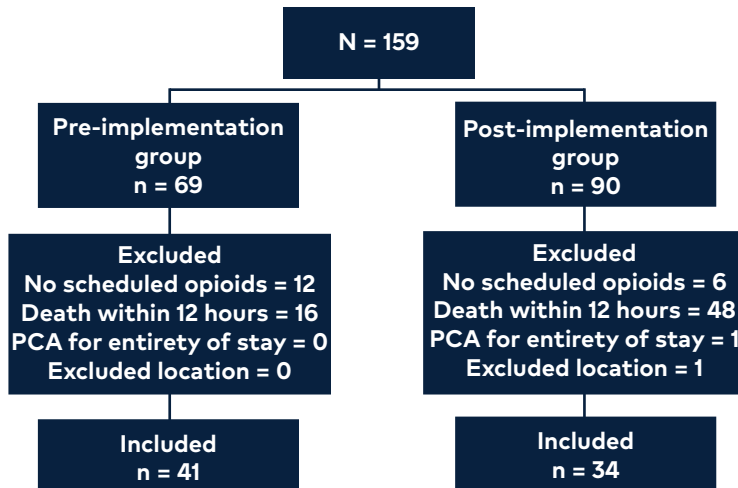
Power calculations were not performed, as this was an early exploratory study where scarce data were available on which to base the calculations. Descriptive statistics were reported as numbers with percentages for categorical data and means with standard deviations for continuous data. All variables for comparison were categorical in nature and analyzed using Pearson's chi-square test. The significance level was predefined at .05.

## Results

A total of 159 patients were screened for inclusion. Of these patients, 75 were included in the final analysis, 41 in the pre-implementation group, and 34 in the post-implementation group. The most common reason for exclusion was death within 12 hours of admission to inpatient hospice ( $n = 64$ ). Details for patient inclusion and exclusion are shown in **Figure 2**. Baseline characteristics were generally similar between the groups (**Table 1**). The 2 campuses do not have hospice-specific nursing units; thus patients were cared for in a variety of nursing units.

In the pre-implementation group, there were 484 scheduled doses among the 41 patients. In the post-implementation group, there were 367 scheduled doses among the 34 patients. The majority of scheduled opioids were administered on time, specifically 89% of doses in the pre-implementation group and 91% of doses in the post-implementation group. However, 61% of patients overall were affected by at least 1 missed or delayed dose. Of these patients, 51% were affected by more than 1 missed or delayed dose.

After nursing education, there were no significant differences between rates of missed or delayed doses (**Table 2**). In the pre-implementation group, missed and delayed doses were distributed evenly between the day shift (0700-1900) and the night shift. However, in the post-implementation group, the distribution of missed and delayed doses changed significantly, with more missed doses during the day shift



**Figure 2.** A flowchart shows hospice patient selection criteria. PCA indicates patient-controlled analgesia.

( $P = .0094$ ) and more delayed administrations during the night shift ( $P = .026$ ). There were no differences between missed ( $P = .14$ ) or delayed doses ( $P = .36$ ) followed by 1-time or as-needed opioid administration (**Table 2**). There was also no significant reduction in missed doses due to nursing discretion ( $P = .49$ ). There were no opioid reversal agents administered during the study period.

There were no significant differences between groups in terms of the proportion of COVID-19-positive patients ( $P = .44$ , **Table 1**). When comparing patients who were and were not COVID-19-positive, there were no significant differences between rates of missed

doses ( $P = .53$ , **Table 3**). However, there were significantly more delayed doses among patients who were COVID-19-positive ( $P = .047$ ).

### Discussion

In this study of inpatient hospice patients, pharmacy-developed, nursing educator-delivered training of nursing staff was not associated with a significant reduction in missed or delayed doses of scheduled opioids. The higher-than-expected rate of doses given on time prior to the primary intervention in this analysis may have affected our ability to detect a significant difference post-implementation. There were, however, significant alterations in the distribution of missed and delayed doses

**Table 1.** Baseline Characteristics of Hospice Patients Before and After a Nursing Opioid Management Education Program

Characteristic	Pre-implementation group (n = 41)	Post-implementation group (n = 34)
Female, n (%)	25 (61)	17 (50)
Age, yr (mean +SD)	79 ± 12	78 ± 13
Hospice LOS*, days (mean +SD)	3 ± 2	2 ± 1
Doses per day (mean +SD)	4 ± 1	5 ± 1
Scheduled opioid exposure†		
Morphine, n (%)	37 (90)	32 (94)
Hydromorphone, n (%)	5 (12)	2 (6)
Fentanyl, n (%)	1 (2)	0 (0)
Diagnosis of COVID-19, n (%)	9 (21)	10 (29)

\*LOS = length of stay

†Patients could be on more than 1 opioid.

**Table 2.** Primary and Secondary Outcomes After a Nursing Opioid Management Education Program for Hospice Patients

Outcome	Pre-implementation group (n = 484)	Post-implementation group (n = 367)	P value
Missed doses, n (%)	26 (5)	13 (4)	.21
Missed doses on day shift (0700-1900), n (%)	13 (50)	12 (92)	<.01
Missed doses followed by 1-time or PRN* opioid administration, n (%)	10 (38)	2 (15)	.14
Missed doses due to nursing discretion, n (%)	19 (73)	8 (62)	.49
Delayed doses (>1 hr), n (%)	28 (6)	21 (6)	.97
Delayed doses on day shift, n (%)	17 (61)	6 (29)	.03
Delayed doses followed by 1-time or PRN opioid administration, n (%)	13 (46)	7 (33)	.36
Administration of reversal agents, n (%)	0 (0)	0 (0)	.99

\*PRN = as-needed

following nursing education, with a higher proportion of missed doses occurring on the day shift and a higher proportion of delayed doses occurring on the night shift. There were no significant differences between rates of missed or delayed doses followed by 1-time or as-needed opioid administration. There were also no differences in missed doses due to nursing discretion. Specific reasons for these missed doses were often unable to be detected. Reassuringly, there were no administrations of reversal agents during the study period.

Previous studies have evaluated the role of dedicated hospice and palliative care teams on patient satisfaction and symptom control at the end of life.<sup>13</sup> However, there is a lack of data to support an optimal medication regimen in patients with significant pain, including those that require inpatient hospice care. In addition, there is limited data regarding the impact of opioid regimen adherence on patient satisfaction and symptom control.

Targeted education is one of the most common tools utilized within health systems for encour-

aging practice-changing behaviors. According to the Institute for Safe Medication Practices, educational programs are relatively easy to implement, but are among the least effective interventions, as they depend on human reliability to effect change.<sup>7</sup> Interventions with greater efficacy including warnings, alerts, reminders, and checklists, are harder to implement.<sup>7</sup> Strategies that depend on true system reliability, such as forcing functions, barriers, fail-safes, automation, and computerization, are the most effective and hardest to implement.<sup>7</sup>

This study was conducted during the COVID-19 pandemic. The time periods for the study were selected based on allowing an adequate time period for education to be disseminated and discussed. Study groups were chosen immediately prior to and post intervention to maintain continuity of practice and staffing when possible. Collecting data within the same season a year apart was decided against due to perceived changes in nursing comfort levels with COVID-19 and overall COVID-19 management practices and experience. While the proportions of all inpatients with COVID-19

**Table 3.** Potential Influence of COVID-19 Status on Administration of Scheduled Opioid Analgesic Doses for Hospice Patients

Outcome	COVID-19 positive (n = 280)	COVID-19 negative (n = 851)	P value
Missed doses, n (%)	8 (3)	31 (4)	.53
Delayed doses (>1 hr), n (%)	18 (6)	31 (4)	<.05

were higher during the post-implementation cohort, we did not find a significant difference in COVID-19 status between groups. When comparing patients across both groups who were positive or negative for COVID-19, we did not find a significant difference in the rate of missed doses ( $P = .53$ ). However, we did find a significant increase in delayed doses greater than 1 hour from scheduled administration among patients who had COVID-19 ( $P = .047$ ).

There were several limitations to this study, including its single-center, retrospective nature. The number of patients was low in the pre-implementation and post-implementation groups. Another limitation was the dissemination of information via multiple clinical nurse educators and nursing leadership rather than one educator or pharmacist. There are also several limitations in regard to the COVID-19 pandemic, including pandemic-related nursing shortages and turnover, which could have affected nurse-to-patient ratios and the universality of education to all nurses in the post-implementation group.<sup>8</sup> Information regarding nurse-to-patient ratios was not collected. Delayed doses could have contributed to delayed care, concerns around personal protective equipment supply and use, and practices of batching care.<sup>9</sup>

## Conclusion

Our study, which focused specifically on inpatient hospice patients with scheduled opioid orders, revealed that pharmacist-developed education delivered by nursing educators did not improve missed or delayed opioid administrations. Further studies are needed to support optimal dosing strategies for inpatient hospice patients with severe pain and system changes to prevent missed and delayed doses in order to prevent breakthrough pain, increase patient comfort, and improve patient and family experiences.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

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## References

1. Hughes MT, Smith TJ. The growth of palliative care in the United States. *Annu Rev Public Health*. 2014;35:459-475. doi:10.1146/annurev-publhealth-032013-182406
2. Groninger H, Vijayan J. Pharmacologic management of pain at the end of life. *Am Fam Physician*. 2014;90(1):26-32.
3. Cherny NI, Fallon MT. Opioid therapy: optimizing analgesic outcomes. In: Cherny NI, Fallon MT, Kaasa S, Portenoy RK, Currow DC, eds. *Oxford Textbook of Palliative Medicine*. 6th ed. Oxford University Press; 2021:chap 7.6.
4. Cobbs EL, Blackstone K, Lynn J. Symptom relief for the dying patient. In: *Merck Manual Professional Version*. Merck & Co. Updated September 2022. Accessed Mar 3, 2023. <https://www.merckmanuals.com/professional>
5. Hui D, Bohlke K, Bao T, et al. Management of dyspnea in advanced cancer: ASCO guideline. *J Clin Oncol*. 2021;39(12):1389-1411. doi:10.1200/JCO.20.03465
6. Beller EM, van Driel ML, McGregor L, Truong S, Mitchell G. Palliative pharmacological sedation for terminally ill adults. *Cochrane Database Syst Rev*. 2015;1(1):CD010206. doi:10.1002/14651858.CD010206.pub2
7. Institute for Safe Medication Practices. Personal practice changes practitioners would make after learning firsthand about medication errors at ISMP. *Medication Safety Alert! Acute Care*. April 21, 2022. Accessed May 31, 2022. <https://www.ismp.org/resources/personal-practice-changes-practitioners-would-make-after-learning-first-hand-about>
8. Lopez V, Anderson J, West S, Cleary M. Does the COVID-19 pandemic further impact nursing shortages? *Issues Ment Health Nurs*. 2022;43(3):293-295. doi:10.1080/01612840.2021.1977875
9. Gordon JM, Magbee T, Yoder LH. The experiences of critical care nurses caring for patients with COVID-19 during the 2020 pandemic: a qualitative study. *Appl Nurs Res*. 2021;59:151418. doi:10.1016/j.apnr.2021.151418