Identification of Patient Factors Predictive of Naloxone Prescription: A Retrospective Cohort Study

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Background

- In 2018 alone, there were a total of 67,367 deaths from drug overdose in the United States with 69.5% of these deaths attributed to opioids.[1]
- The US Department of Health and Human Services recommends naloxone be accessible to all patients at high risk of opioid overdose to reduce overdose deaths.[2]
- Despite increasing rates of naloxone distribution, widespread access to this medication is still lacking.

Objective

The objective of this study was to elucidate factors predictive of naloxone prescription in a large federally qualified health center (FQHC) to better target educational efforts and reduce barriers to access.

Methods

- A retrospective chart review was conducted of all patients prescribed naloxone within a FQHC over a 5-year time period.
  - August 1st 2015 - August 1st 2020
- An initial chart query was performed, and 114 patients were identified as having received naloxone via prescription during this time period.
- A second chart query was performed to identify patients receiving long-term opioid prescriptions and no naloxone during the same time frame.
  - "Long-term" was defined as three or more opioid prescriptions in a rolling 12-month time period.
  - From this sample, 114 patients were randomly selected from the queried charts to serve as comparison to those patients who were prescribed naloxone.
- A chart abstraction was conducted to collect additional patient factors including: race, sex, age, income level, opioid indication, and concurrent co-prescription of benzodiazepines, sleep hypnotics, or skeletal muscle relaxants.
- A binomial logistic regression analysis was performed to ascertain the effects of these patient factors on the likelihood that a patient receiving any opioid over a five-year span would be prescribed naloxone.

Results

	Total No. (%)	Naloxone Prescription No. (%)	No Naloxone Prescription No. (%)	Odds Ratio (95% CI)
Age, Mean (SD)	55.1(12.9)	51.73 (12.3)	58.48 (12.6)	1.04 (1.02-1.07)
Sex	228	114	114	
Male	88 (38.6)	48 (21.1)	40 (17.5)	1.60 (0.88-2.91)
Female	140 (61.4)	66 (28.9)	74 (32.5)	0.63 (0.34-1.14)
Race / Ethnicity	227	114	113	
Caucasian	169 (74.4)	104 (45.8)	65 (28.6)	7.43 (3.46-15.95)
African American	54 (23.8)	8 (3.5)	46 (20.3)	0.11 (0.05-0.25)
Other	4 (1.8)	2 (0.9)	2 (0.9)	-
Primary Opioid*	228	114	114	
Buprenorphine	28 (12.3)	27 (11.8)	1 (0.4)	20.39 (2.60-159.91)
Hydrocodone	78 (34.2)	28 (12.3)	50 (21.9)	0.45 (0.24-0.84)
Tramadol	55 (24.1)	4 (1.8)	51 (22.4)	0.04 (0.02-0.13)
Oxycodone	27 (11.8)	25 (11.0)	2 (0.9)	32.93 (5.79-187.37)
Morphine	11 (4.8)	11 (4.8)	0 (0.0)	-
Fentanyl	7 (3.1)	5 (2.2)	2 (0.9)	3.28 (0.37-29.25)
Methadone	3 (1.3)	3 (1.3)	0 (0.0)	-
Hydromorphone	5 (2.2)	4 (1.8)	1 (0.4)	2.99 (0.31-28.99)
Tapentadol	3 (1.3)	3 (1.3)	0 (0.0)	-
Opioid Indication	228	114	114	
Chronic Pain	198 (86.8)	85 (37.3)	113 (49.6)	-
Opioid Use Disorder	30 (13.2)	29 (12.7)	1 (0.4)	22.71 (2.86-180.53)
Concurrent Medications				
Benzodiazepine	93 (40.8)	52 (22.8)	41 (18.0)	1.22 (0.68-2.19)
Sleep Hypnotic	25 (11.0)	14 (6.1)	11 (4.8)	0.99 (0.39-2.47)
Skeletal Muscle Relaxant	110 (48.2)	54 (23.7)	56 (24.6)	0.87 (0.49-1.54)
Income Category	227	114	113	
100% and Below	122 (53.7)	60 (26.4)	62 (27.3)	0.75 (0.42-1.35)
101-150%	21 (9.3)	9 (4.0)	12 (5.3)	0.85 (0.32-2.29)
151-200%	11 (4.8)	7 (3.1)	4 (1.8)	1.57 (0.39-6.28)
Over 200%	21 (9.3)	13 (5.7)	8 (3.5)	1.81 (0.66-5.02)

* Each primary opioid dummy coded into dichotomous categorical variables and controlled for age, sex, and ethnicity

Results (continued)

- The model explained 33.3% of the variance in naloxone prescription and correctly classified 70% of the cases.
- Caucasians were significantly more likely to receive naloxone when prescribed an opioid compared to non-Caucasian patients (OR 7.43, 95% CI 3.46-15.95).
- Patients categorized as having opioid use disorder were 22 times more likely to receive a prescription for naloxone compared to patients receiving opioid therapy for a chronic pain indication (OR 22.71, 95% CI 2.86 – 180.53).
- Patient sex, income level, and concurrent use of non-opioid medications known to increase risk of opioid overdose did not predict receipt of naloxone.
- When primary opioid was modeled buprenorphine and oxycodone were predictive of naloxone prescribing.

Conclusion

- These findings suggest there are numerous disparities in terms of naloxone prescribing and significant opportunity for prescriber education.
- Within this study Caucasian patients were more likely to be prescribed naloxone than their non-Caucasian counterparts.
  - This highlights a potential heath disparity that exists.
- Patients categorized as having opioid use disorder were 22 times more likely to receive naloxone.
  - Patients using for chronic pain are also still at risk.
- Patients concurrently prescribed benzodiazepines, sleep hypnotics, and skeletal muscle relaxants were no more likely to be prescribed naloxone than patients prescribed long-term opioids alone.
  - These medications increase the risk of overdose and highlight a need for prescriber intervention.
- In order to reduce barriers to naloxone access for patients these disparities in its prescription should be a focus of future prescriber education efforts.

References

1. Guy GP, Haegerich TM, Evans ME, Losby JL, Young R, Jones CM. Vital signs: Pharmacy-based naloxone dispensing - united states, 2012-2018. *MMWR Morb Mortal Wkly Rep*. 2019;68(31):679-686. Accessed May 14, 2020. doi: 10.15585/mmwr.mm6831e1.
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