Identification of Opioid Overdose Risk in Primary Care

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Abstract

Background: The Centers for Disease Control and Prevention (CDC) estimates an average of 41 deaths per day resulting from opioid use. Identification of patients at risk of overdose or opioid induced respiratory depression (OIRD) is the primary modality of preventing opioid related deaths.

Measures: This study is a quality improvement project of mixed design. Responses were gathered from participating providers and a chart review of qualifying patients.

Intervention: To determine patient OIRD risk, physical assessors were identified in order to assess patients who met the inclusion criteria of the Risk Index for Overdose or Serious Opioid-induced Respiratory Depression (RIOSORD).

Outcomes: The primary outcome measures were the level of satisfaction of providers who applied the RIOSORD tool. Secondary outcome measures were the identities of at-risk patients who were identified using the RIOSORD tool.

Conclusions/Lessons Learned: Assessors were unanimous in their approval of the RIOSORD and several patients were identified as being at high risk of OIRD.

Keywords: opioid, respiratory depression, accidental overdose, assessment tools, protocols or guidelines

Key Message: This article describes a quality improvement study that utilizes an in-depth risk assessment tool to rapidly identify patients displaying an elevated risk of opioid induced respiratory depression or overdose.

Identifying Opioid Overdose Risk through Assessment

The Centers for Disease Control and Prevention (CDC) estimates that there were over 46,800 deaths caused by opioid overdose in 2018.[1] This number accounts for 67.8% of all drug-related deaths.[2] The number of opioid-related deaths is predicted to rise to approximately 81,500 by 2025.[3] To reduce the number of opioid users in the United States (US), the CDC introduced a guideline for prescribing opioids in the treatment of chronic pain that is unrelated to cancer treatment, palliative care or end of life care.[4] This guideline was successful in reducing opioid prescriptions in the US from 72.4 opioid prescriptions per 100 persons to 58.5 opioid prescriptions per 100 persons.[5] While the guideline proved effective in 2016, from 2018 to 2019, there was a 7% increase in opioid related deaths.[6]

Drug overdose and opioid-related deaths are preventable, but a shift in policy and treatment strategies is necessary for prevention. The identification of opioid overdose risk factors in each patient can be beneficial in reducing the number of deaths caused by prescription opioids.[7] Early identification of at-risk patients allows practitioners to re-evaluate treatment plans by identifying and treating an opioid use disorder, modifying the prescription dosage or by providing the patient an overdose reversal agent.[8] Risk factors may include dosage, opioid type, co-prescriptions (such as benzodiazepines, gabapentin or other respiratory affecting medications), and co-morbidities (such as liver disease, kidney disease, or other metabolic-changing physiology that would alter the excretion time of medication).[9,10]

The purpose of this Quality Improvement (QI) project is to measure the how well providers in rural family practice adhere to the opioid risk assessment tool and the consequent efficacy of the tool in reducing the risk of OIRD in patients who are prescribed opioid medications. The site was chosen for this project due to increased opioid therapy potential, as

family practice and internal medicine providers prescribe more opioids than other types of providers, including pain management clinics.[11] This QI project applied an opioid risk-assessment tool developed by Zedler et al.[9] The tool was designed and validated to identify patients at risk for opioid-induced overdose. Called the Risk Index for Overdose or Serious Opioid-induced Respiratory Depression (RIOSORD), the tool proved to be highly accurate in predicting elevated risk of overdose in a large population of US users of prescription opioids.[7] Permission to use the RIOSORD tool was granted by its developers, a research team working with the Veterans Health Administration (VHA).[7]

Background

Several factors may have contributed to the current opioid crisis in the US.[12] In the mid-1980s, the World Health Organization (WHO) created a Cancer Pain Monograph to highlight the apparent undertreatment of postoperative and cancer-related pain.[12] Following this, additional papers began to be written on the undertreatment of chronic, non-cancer related pain. In the mid-1990s, the American Pain Society developed and promoted a campaign that identified pain as the fifth vital sign.[12] At the time, the general consensus of physicians and pharmacists was that opioids had a low addictive quality.[12] In the mid-1990s, the Federal government reduced restrictions on opioid prescriptions and the Joint Commission, which is responsible for healthcare organization accreditation and Medicare and Medicaid reimbursement, began mandating that physicians must provide adequate pain control.[12] Hospital administrators operated under the impression that they would lose federal healthcare funding if they were not in compliance with the guidance of the Joint Commission.[12]

Opioids are a central nervous system depressant which can cause dramatic reductions in respiration, increased sedation, and possibly coma.[7] Opioid induced respiratory distress is the

cause of most opioid-related deaths.[13] It increases in likelihood when opioids are combined with other medications that may also depress the central nervous system or cause a more relaxed respiratory response. These medications include gabapentin, antidepressants, benzodiazepines, barbiturates, alcohol, and others.[7,10,14] Physical comorbidities that elevate the risk of OIRD include kidney damage, liver damage, and obesity, due to their negative impacts on the body's ability to excrete the medication.[7,15]

There is a need for an accurate risk assessment tool that can identify opioid users who may experience an increased risk of OIRD or overdose.[6,7,9,14,15,16] The most effective methods of preventing opioid-related overdose and death are to improve opioid prescribing, reduce exposure to the opioids, prevent misuse, and treat opioid misuse disorder.[8,14]

Prevention Modalities

The rate of overdose and death from opioid use has become a major public health issue in the US. Local, state, and national organizations have all presented their recommendations for the mitigation of opioid overdose and death. Many of the recommendations center on opioid stewardship by health care providers, the implementation of CDC guidelines, and the implementation of opioid risk disorder screening protocols.[17] Additionally, there are several procedures that may help to prevent OIRD and overdose.[7,9,14] These procedures include changes to clinical practice, the use of naloxone to reverse overdose, opioid substitution therapies, take-back programs for excess medications, prescription monitoring, and community or public health campaigns.[14]

It is essential for providers to have the capacity to identify OIRD risk factors – and patients who display those factors – before an OIRD event can manifest.[9] The use of a risk assessment tool allows providers to more readily identify those opiate users that may be at

increased risk of overdose.[7,9,10] Identification methods are problem-focused and improve the cost effectiveness of all other prevention modalities. Education of provider and patient on opioids and their interactions with other medications, alcohol, and comorbidities is the next most effective prevention modality.[9,14,15,16,18] While the number of prescriptions for opioids is steadily declining, the number of opioid-related deaths in the US remains at approximately 41 per day.[1] Identification of risk factors and education of providers and patients may be some methods of reducing this figure.

This QI project explores patient intervention in the early stages of the provider-patient relationship, particularly during the initial assessment for therapy with an opioid. The RIOSORD assessment tool considers combined risks, such as opioid strength, duration of prescription, other medications being taken at the same time, alcohol consumption, and physical comorbidities that may affect excretion of medication and result in an elevated overall risk of overdose and OIRD.[7] This rapid assessment then presents the provider a percentage figure of the probability of overdose. Providers will thus be able to quickly determine the overdose risk and alter their treatment plans with opioid replacement therapies, naloxone co-prescribing, or offering opioid dependency reduction programs.

Measures

This study took place in a rural community in Virginia and conducted a three-month implementation of the RIOSORD tool using a quality improvement project designed and implemented by a nurse practitioner (NP) student. Primary outcomes were gathered from the provider's assessment tool use and the provider's satisfaction with intervention. These outcomes were measured using qualitative data gathered from surveys completed by the providers, relating to the ease-of-use and efficacy of the assessment tool. Secondary outcomes were gathered from

patients identified as being at risk of overdose after intervention. These outcomes were measured with quantitative data collected through chart review during implementation.

Participants

A sample of one provider – a doctor of osteopathic medicine and his team of nurses and medical assistants in a family practice clinic – was studied. This provider was selected based on inclusion criteria for the project, which only included providers who were licensed to prescribe opioid therapy and direct care staff who were authorized to assess patients. Personnel not providing direct patient care, and those without the appropriate assessment skills in their scope of practice, were excluded from the study.

Method

Data was obtained through survey questions and patient chart reviews. Survey responses were used to determine the ease and effectiveness of the tool and providers' overall satisfaction with the intervention. The data obtained from the patient chart review was used to identify the number of patients screened for risk of opioid overdose and to obtain demographic information on the age, gender, and race of patients, in relation to the demonstrated risk percentage.

Intervention

This study used a multidisciplinary team approach, including a Doctor of Nursing Practice nurse practitioner student and all direct care providers in the rural private practice family health clinic. All participants were given thorough instructions on the use of the RIOSORD assessment tool, and the intervention was used on all patients over the age of 18 being prescribed an opioid medication to treat a chronic pain diagnosis.

This QI project was approved by the Institutional Review Board at Lenoir-Rhyne University, Hickory, North Carolina. Communications between the Principal Investigator (PI)

and stakeholder were conducted through email, Zoom meetings and in-person site visits. The PI conducted live meetings with all direct care providers to discuss project implementation and use of the RIOSORD tool, as well as to identify the prospective ICD-10 codes used during the implementation process. The intervention team was given laminated copies of the intervention to complete during the assessment process for each patient identified with the ICD-10 codes G89.4, "chronic pain syndrome", and G89.29, "other chronic pain," with their assessment results documented in the patient's EMR.

Data Analysis

Survey questions were created and administered to all direct care providers who were participating in this QI project. A patient chart review was completed through the 12 weeks of implementation. Data was stored and managed in Intellectus Statistics™. Inferential statistics were obtained using a Mann-Whitney Test, and a linear regression was used to predict and assess the relationship between age, race, gender and the OIRD risk percentage.

Outcomes

Three respondents responded to four questions of the assessment survey. All respondents were in unanimous agreement that the RIOSORD tool was self-explanatory and simple to use. The respondents also all agreed that the assessment tool was more effective than the tool they had been using at the time. One provider commented, "the RIOSORD tool was more effective because it is more inclusive." All respondents answered that they would continue to use the RIOSORD tool, or a similar tool, due to its effectiveness and ease-of-use.

At the completion of the implementation period, a total of 1,210 patients were assessed and treated. One hundred two patients were identified as having ICD-10 Codes G89.4 or G89.29. Of those patients, 12 were excluded as duplicates, three were excluded due to cancer diagnoses,

and 20 were excluded because they did not receive opioid therapy. The remaining 67 patients were assessed using the RIOSORD tool. The most frequently observed category of gender was female (n = 35, 53%). The most frequently observed category of race was white (n = 53, 79%). The assessment tool identified seven patients as displaying a greater than 50% probability of an OIRD event.

A two-tailed Mann-Whitney two-sample rank-sum test was conducted to determine if there were significant differences in RIOSORD results between the gender and race categories. The tests did not show a significant difference between the categories. The result of the two-tailed Mann-Whitney U test for gender was not significant ($\alpha = 0.05$, $U = 541.5$, $z = -0.26$, $p = .795$). The mean rank for the "female" category was 33.47 and the mean rank for the "male" category was 34.58. This suggests that the distribution of RIOSORD results for individuals in the "female" category was not significantly different from the distribution of RIOSORD results for individuals in the "male" category. The result of the two-tailed Mann-Whitney U test for race was also not significant ($\alpha = 0.05$, $U = 461$, $z = -1.56$, $p = .120$). The mean rank for the "white" category was 35.70 and the mean rank for the "black" category was 27.57. This suggests that the distribution of RIOSORD results for individuals in the "white" category was not significantly different from the distribution of RIOSORD results for individuals in the "black" category.

A linear regression analysis was conducted to determine if RIOSORD results significantly predicted age. The results of the linear regression model were not significant ($F(1,65) = 0.13$, $p = .718$, $R2 = 0.00$), indicating RIOSORD results did not explain a significant proportion of variation in age.

Conclusions and Lessons Learned

The outcome of this Quality Improvement project was successful in supporting the use of the RIOSORD tool. The qualitative results showed that all respondents were in favor of the RIOSORD assessment tool and would continue to use it in their practice. The quantitative results showed that the results of the RIOSORD assessment does not differ between individuals in different age, race, or gender categories.

The opioid epidemic in the US requires a multi-faceted response to stem the high rates of OIRD and death from opioid overdose. The use of safer opioid prescribing practices is an important component of a comprehensive approach to mitigating OIRD and opioid-related overdose. The RIOSORD tool provides a simple and effective means of identifying patients at risk of opioid abuse and gives healthcare providers the means of early intervention for those individuals. Consistent use of the RIOSORD tool could lead to diminishing levels of drug-related mortality.

Limitations

The number of responses to the qualitative survey was limited, and all respondents were on the same team, which may have resulted in bias. The project was implemented in a small town in Virginia and is only representative of a small population.

Future Studies

In addition to patients suffering from chronic pain, the RIOSORD assessment tool has the potential to identify a larger demographic of at-risk patients using opioids. Future studies can include assessments of acute-care patients being treated with opioids, as they also have the potential to develop OIRD and substance addictions.

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