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ORIGINAL ARTICLE

Pilot Study of the Importance of Factors Affecting Emergency Department Opioid Analgesic Prescribing Decisions

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Abstract
Introduction Little is known about the factors driving decision-making among emergency department (ED) providers when prescribing opioid analgesics (OA). The aim of this pilot study was to identify the importance of factors influencing OA-prescribing decisions and to determine how this varied among different types of providers.
Methods This was an observational cross-sectional survey study of 203 ED providers. The importance of decisional factors was rated on a 5-point Likert scale. Differences between provider groups were tested using Chi-squared or ANOVA tests where applicable.
Results Overall, 142/203 (69.9 %) potential respondents participated in the study. The five highest-rated factors were (mean ± SD) patient's opioid prescription history (4.4 ± 0.8), patient's history of substance abuse or dependence (4.4 ± 0.7), diagnosis thought to be the cause of patient's pain (4.2 ± 0.8), clinical gestalt (4.2 ± 0.7), and provider's concern about unsafe use of the medication (4.0 ± 0.9). The importance of 6 of 21 decisional factors varied significantly between different groups of providers.
Conclusion In this pilot study of ED providers, the self-reported importance of several factors influencing OA-prescribing decisions were significantly different among attending physicians, resident physicians, and advanced practice providers. Further investigation into how ED providers make OA-prescribing decisions is needed to help guide interventions aimed at improving appropriate pain management.

Keywords Opioid prescribing · Prescription drug abuse · Pain management

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Introduction

Poisoning, and in particular drug overdose, has become the leading cause of injurious death in the USA. The number of drug poisoning deaths has increased steadily for the past two decades. In 2013, the number of deaths from drug poisoning totaled 43,982, including 16,235 that involved opioid analgesics (OA) [1]. The rate of drug poisoning deaths specifically involving OA has nearly quadrupled from 1.4 to 5.1 per 100,000 during the period from 1999 to 2013 [1]. Roughly three quarters of all pharmaceutical drug overdose deaths involve OA [2]. Additionally, in 2011, OA overdose was responsible for an estimated 420,040 emergency department (ED) visits [3]. This public health epidemic poses significant problems for EDs and has engendered research into mechanisms to decrease the morbidity and mortality of OA overdose.

Across the USA, the number of prescriptions for OA has steadily increased concomitantly with the increasing rate of overdose deaths. In 2012, nearly 259 million OA prescriptions were dispensed nationally [4]. The rate of OA prescribing has likewise increased in emergency departments. Based on an analysis of the National Hospital Ambulatory Medical Care Survey (NHAMCS) dataset, in 2010, 31 % of all ED visits

involved the prescription of an OA (either while the patient was in the ED or at the time of discharge), compared to 20.8 % in 2001 [5].

Emergency physicians (EP) have been tasked to both improve the treatment of pain [6–8] and mitigate the increasing risks of addiction and overdose by judiciously prescribing OA [9, 10]. Prescribing OA in the ED is based on a complex series of decisions. While several prescribing guidelines exist, they are mostly based on expert consensus [11–14]. The role of pain control in patient satisfaction and the concern of providers about prescribing to patients thought to be abusing or addicted to OA further illustrates the disparate potential influences on prescribing decisions [15, 16].

Further compounding the complexity of OA-prescribing decisions is a paucity of quality education regarding pain management, particularly among emergency medicine residency programs [17, 18]. Resident physicians likely develop many of their OA-prescribing habits by patterning the habits of the attendings who train them.

Prior studies have found that emergency physicians have a high degree of variability in their OA-prescribing practices [19, 20]. However, the factors important to provider decision-making have not been explicitly described.

The main aim of this pilot study was to identify the self-rated importance of various factors influencing providers when making the decision to prescribe an OA. Similar prior work does not exist in the literature. Information was also collected about OA-prescribing practices and attitudes toward prescribing. The main hypothesis was that the relative importance of decision-making factors would be highly variable among providers, even within a single institution. Specifically, healthcare providers at different training levels—attending physicians, resident physicians, and advanced practice providers—would differ in their opinions about the importance of decision-making factors influencing prescribing decisions.

Material and Methods

Study Design and Population

This was an observational cross-sectional survey study of all ED providers (attending physicians, resident physicians, and advanced practice providers) who prescribe OA affiliated with a single multi-site academic emergency medicine training program.

The study setting was an online survey conducted over a 3-month period from May 20, 2013, until August 12, 2013. The population eligible to participate in the survey included 203 providers—104 attending physicians, 59 resident physicians, and 40 advanced practice providers (including both nurse practitioners and physician assistants). Eligible providers worked in one or more of five hospital-based EDs. There were no exclusion criteria. All of the affiliated hospitals are located in a large urban area. The emergency departments include two pediatric EDs and three adult EDs. The adult EDs include a large urban safety net hospital, a community hospital, and a university hospital.

All subjects who participated in the study provided written informed consent via an online checkbox prior to completing the questionnaire. The study protocol was reviewed and approved by the local institutional review board.

Survey Content and Administration

Study investigators were guided by the methodology outlined by Burns for the design and conduct of physician self-administered surveys [21]. The study questionnaire was written by the investigators and iteratively edited for purposes of item generation and improving structure. Given the preliminary nature of this pilot study, item generation was initially performed by the investigators through brainstorming discussion and consensus. Particularly in regard to the decisional factors included in the questionnaire, the investigators were guided by their own clinical experiences prescribing OA to generate a list and this was refined by discussions with practicing emergency physicians. A previously published survey study of opioid-prescribing practices among medical toxicologists was reviewed to identify other possible topics for inclusion in the questionnaire [22]. The study questionnaire covered topics including demographic information, OA-prescribing practices at ED discharge, the importance of various factors in making prescribing decisions, and attitudes about OA prescribing. Pilot testing and clinical sensibility testing was performed using emergency physicians with a similar perspective to the potential respondents to improve question clarity and assist with item reduction.

The study was administered using an online survey tool (SurveyMonkey, http://www.surveymonkey.com). Enrollment was conducted via intradepartmental email distribution lists. One week prior to the start of the study period, a message announcing the survey was sent to all potential respondents. A second email was sent on the day the survey opened. Reminder emails were sent on a periodic basis to encourage completion of the survey. In addition, to boost participation, two $50 gift cards were offered as rewards for those who completed the survey and wished to enter a reward sweepstakes. The reward sweepstakes was independently administered and awarded through the SurveyMonkey website.

Data Analysis

In this single-center survey study, the investigators intended to perform a complete census of the study population. All survey

responses were collated and analyzed in aggregate and all responses were anonymous. Responses included categorical data, continuous data, ordinal data, and subjective responses. Subjective responses asked for the assignment of a level of agreement, or self-rated importance, to a specific statement or question on a 5-point Likert scale (1-not important or strongly disagree, 3-neutral, 5-very important or strongly agree). Categorical and continuous data were analyzed with descriptive statistics and not further compared with statistical testing. The mean and standard deviation of the subjective measures were then analyzed for skewness and kurtosis to assess for normality of distribution and homogeneity of variance with the purpose of utilizing parametric testing in this sample. After satisfying these assumptions, intergroup statistical comparisons were then conducted for the subjective responses between the three provider types (attending physicians, resident physicians, and advanced practice providers) included in the study. Analysis of variance (ANOVA) tests were used to determine if equality of the means between provider groups was present for the subjective response variables. Because of the limited sample size and multiple outcomes, a power calculation was not performed prior to data collection. Statistical analyses were performed in SAS v9.4 (Carey, NC).

Results

Among the total eligible population of 203 individuals, 143 (70.4 %) responded to the survey invitations, and 142 (69.9 %) consented to participate in the study. Response rates were similar across all three groups of providers with 72/104 (69 %) attending physicians, 42/59 (71 %) resident physicians, and 28/40 (70 %) advanced practice providers responding. Additional information about non-respondents was not available. Table 1 provides additional descriptive demographic data about the survey population.

Providers exhibited variability in the self-rated importance of various factors influencing their decision to prescribe an opioid analgesic. The five highest-rated factors were (mean ± SD) patient's opioid prescription history (4.4 ± 0.8), patient's history of substance abuse or dependence (4.4 ± 0.7), diagnosis thought to be the cause of patient's pain (4.2 ± 0.8), clinical gestalt (4.2 ± 0.7), and provider's concern about unsafe use of the medication (4.0 ± 0.9). The five lowest rated factors were patient age (3.0 ± 1.0), patient satisfaction (3.0 ± 0.9), patient's reported pain score (3.1 ± 1.1), the prescribing culture of the clinical site (3.1 ± 1.1), and provider's concern about medication diversion (3.3 ± 1.1) (Table 2). Significant differences between provider types were found for the following factors: patient's reported pain score, patient requests opioid medications on discharge, patient's overall satisfaction, prescribing culture of clinical sites where provider works, provider concern about doctor shopping, and provider concern about unsafe use of the medication (Table 3).

There was a high level of agreement among all respondents (4.0 ± 0.8) with the statement "ED providers should consider the public health effects of opioid medications when writing a prescription for any given patient." Respondents as a whole also agreed that ED providers are a significant source of OA medications that are diverted or misused and that ED providers can impact the current public health epidemic by changing their prescribing practices. The only statement with significant differences between groups was "my prescribing practice is influenced by the prescribing culture of the clinical sites where I work," with attending physicians as a group indicating a neutral opinion (2.7 ± 1.0) and resident physicians

Table 1 Descriptive characteristics of survey respondents

	Respondent characteristics ($n = 142$)
Age (median, IQR)	34 (30–41)
Sex (male, %)	47 %
Clinical hours worked per month (median, IQR)	104 (60–160)
Role in the ED	
Attending ($n = 72$)	51 %
Resident PGY-3 ($n = 12$)	8 %
Resident PGY-2 ($n = 20$)	14 %
Resident PGY-1 ($n = 10$)	7 %
Advanced practice provider ($n = 28$)	20 %
Prior palliative care experience (yes, $n = 14$)	10 %
Years in practice since medical or PA/NP school (median, IQR)	9 (4.5–14.5)

IQR interquartile range

Table 2 Opinions regarding the importance of factors in the decision to prescribe opioid medications upon ED discharge

Factors in your decision whether or not to prescribe opioid medications upon ED discharge (mean ± SD) 5 = very important 3 = neutral 1 = not important	All respondents	Attending	Resident	Advanced practice provider	Test of significance (ANOVA)
Diagnosis thought to be the cause of the patient's pain ($n = 134$)	4.2 (0.8)	4.19 (0.7)	4.18 (0.8)	4.31 (0.7)	0.7557
The patient's reported pain score ($n = 134$)	3.1 (1.1)	2.99 (1.1)	2.89 (1.0)	3.60 (0.9)	0.0283
The patient's age ($n = 134$)	3.0 (1.0)	2.81 (1.1)	3.05 (0.9)	3.20 (1.0)	0.2267
Patient's vital signs and physical exam findings ($n = 134$)	3.7 (1.0)	3.52 (1.0)	3.87 (0.9)	3.69 (1.0)	0.1812
Patient's apparent level of distress ($n = 134$)	3.8 (0.8)	3.70 (0.8)	3.87 (0.8)	3.84 (0.7)	0.4826
Laboratory or imaging results ($n = 134$)	3.5 (0.9)	3.38 (0.9)	3.64 (0.8)	3.73 (0.9)	0.1433
Patient's opioid prescription history, if known ($n = 134$)	4.4 (0.7)	4.39 (0.7)	4.35 (0.7)	4.38 (0.8)	0.9760
Patient's other current medications ($n = 134$)	3.9 (0.9)	3.84 (0.9)	3.80 (0.8)	4.20 (0.7)	0.1799
Patient history of substance abuse or dependence ($n = 134$)	4.4 (0.7)	4.29 (0.8)	4.46 (0.6)	4.65 (0.6)	0.0833
Patient requests opioid medications on discharge ($n = 134$)	3.6 (1.1)	3.38 (1.1)	3.97 (1.0)	3.85 (1.0)	0.0176
Patient's overall satisfaction ($n = 134$)	3.0 (0.9)	2.80 (0.9)	3.10 (0.9)	3.35 (0.9)	0.0257
Amount and type of opioid medication given in the ED that was required to control the patient's pain. ($n = 133$)	3.8 (0.7)	3.77 (0.8)	3.90 (0.8)	4.0 (0.6)	0.3846
Your clinical gestalt ($n = 133$)	4.2 (0.7)	4.25 (0.7)	4.21 (0.7)	3.88 (0.61)	0.0687
Prescribing culture of the clinical sites where you work ($n = 133$)	3.1 (1.1)	2.54 (1.1)	3.90 (0.8)	3.32 (0.9)	<0.0001
Your concern about side effects of the medication ($n = 133$)	3.8 (0.9)	3.65 (0.9)	3.76 (0.8)	4.04 (0.8)	0.1450
Your concern about promoting addiction ($n = 133$)	3.6 (1.1)	3.43 (1.1)	3.97 (0.9)	3.69 (1.1)	0.1150
Your concern about medication diversion ($n = 133$)	3.3 (1.0)	3.36 (1.1)	3.12 (1.0)	3.58 (0.9)	0.1854
Your concern about doctor shopping ($n = 133$)	3.7 (1.1)	3.75 (1.1)	3.24 (1.2)	4.0 (0.9)	0.0149
Your concern about unsafe use of the medication ($n = 133$)	4.0 (0.9)	3.96 (0.9)	3.80 (0.9)	4.39 (0.7)	0.0293
Your concern about non-medical use of the medication ($n = 133$)	3.8 (1.0)	3.75 (1.1)	3.73 (1.1)	4.15 (0.8)	0.2038
Your concern about medication overdose ($n = 133$)	3.8 (1.0)	3.74 (1.0)	3.68 (1.1)	4.04 (0.8)	0.3120

SD standard deviation, *ANOVA* analysis of variance

(3.82 ± 0.7) and advanced practice providers (3.46 ± 0.9) indicating agreement (Table 3).

Discussion

This study provides new information about how ED providers make OA-prescribing decisions. The two factors that were rated highest when making OA-prescribing decisions were "patient's opioid prescription history" and "patient's history of substance abuse or dependence." These were thought to be more important than the patient's diagnosis, provider's clinical gestalt, and patient's level of distress. These findings are interesting and may reflect ED provider concerns about the current epidemic of OA overdose deaths. The data supports this point too, as the study population indicated a high level of agreement (4.0 ± 0.8) with the statement "ED providers should

Table 3 Description of ED provider attitudes toward prescribing opioids

Indicate your level of agreement with the following questions: (mean ± SD) 5 = strongly agree 3 = neutral 1 = strongly disagree	All respondents	Attending	Resident	Advanced practice provider	Test of significance (ANOVA)
Emergency department (ED) providers are a significant source of opioid medications that are used non-medically or diverted. ($n = 133$)	3.7 (0.9)	3.64 (0.9)	3.92 (0.9)	3.77 (0.9)	0.3165
ED providers should consider the public health effects of opioid medications when writing a prescription for any given patient. ($n = 133$)	4.0 (0.8)	3.87 (0.9)	3.97 (0.9)	4.15 (0.7)	0.3315
ED providers can impact the public health problems due to opioid medications by changing their prescribing practices. ($n = 133$)	3.8 (0.8)	3.71 (1.0)	3.84 (0.8)	3.85 (0.7)	0.7371
I can accurately identify patients who are doctor shopping. ($n = 133$)	2.7 (0.8)	2.65 (0.8)	2.68 (0.7)	3.08 (0.8)	0.0633
I can accurately identify patients who are addicted to or dependent on opioid medications. ($n = 133$)	3.0 (0.9)	2.87 (0.8)	3.02 (0.9)	3.12 (0.8)	0.3991
I tend to give more opioid medications on discharge than my colleagues. ($n = 132$)	2.4 (0.9)	2.44 (0.8)	2.37 (0.9)	2.35 (0.8)	0.8573
I would rather over-prescribe and risk some medication diversion or non-medical use, than under-prescribe and not treat a patient's pain. ($n = 132$)	3.2 (1.0)	3.37 (1.1)	3.21 (1.0)	2.92 (0.7)	0.1686
My prescribing practice is influenced by my observations of friends and family members experience with prescription opioids. ($n = 131$)	2.1 (0.9)	2.06 (0.9)	2.14 (0.9)	2.12 (0.9)	0.9133
My prescribing practice is influenced by the prescribing culture of the clinical sites where I work. ($n = 132$)	3.2 (1.0)	2.72 (1.0)	3.82 (0.7)	3.46 (0.9)	<0.0001

SD standard deviation, *ANOVA* analysis of variance

consider the public health effects of opioid medications when writing a prescription for any given patient." This was the highest level of agreement for any of the statements included on the questionnaire.

The results show that the importance of 6 of the 21 decision factors included on the questionnaire varied significantly between different groups of providers. Compared to other groups, attending physicians gave lower importance to "patient's overall satisfaction," "patient requests opioid medications on discharge," and "prescribing culture of the clinical sites where you work." While resident physicians gave higher importance to "prescribing culture of the clinical sites where you work" and "patient requests opioid medications on discharge" compared to other groups, and lower importance to "patients reported pain score," "your concern about doctor shopping," and "your concern about unsafe use of the medication." Advanced practice providers gave higher importance than other groups to "the patient's reported pain score," "patient's overall satisfaction," "your concern about doctor shopping," and "your concern about unsafe use of the medication."

What underlies the differences between groups can only be speculated, though a difference in training and education around OA prescribing is an implied contender. Attendings being less influenced than residents by patient requests for OA and by the prescribing culture of a clinical site are not a surprising finding. The clinical experience of attendings compared to residents undoubtedly plays a role in each group's respective decision-making process. It is interesting that residents found doctor shopping and unsafe use less important than other groups. Another noteworthy aspect of the data

pertains to differences among advanced practice providers. As the role of advanced practice providers in emergency medicine continues to grow, understanding the attitudes and practices of this group will be important. Advanced practice providers at the study center tend to work a high proportion of shifts in fast track/up-front care areas of the emergency department and are often exposed to patients presenting with chronic pain complaints or requesting OA medications. This may be one reason why advanced practice providers were more concerned about doctor shopping, patient satisfaction, and unsafe medication use compared to other groups. It could simply be the case that differences found between groups are unique to the study site. However, common sense would suggest that differences among these groups are likely to exist at other EDs across the country.

Interestingly, the greatest difference in importance between any two groups and for any factor was regarding the "prescribing culture of the clinical sites where you work," which attending physicians rated 2.54 ± 1.1 and resident physicians 3.90 ± 0.8. This difference likely underscores an implicit curriculum that resident physicians receive during their training through observations of the practice patterns of their attending physicians. The result also suggests that resident physicians might be influenced to make different OA-prescribing decisions based on their training environment. Others have called for improved emergency medicine resident education on pain management and OA prescribing as a means to decrease rates of drug diversion and abuse and improve appropriate pain management [17]. Further exploration of this topic is warranted.

Interpreting this new evidence in the light of prior knowledge about what influences OA prescribing is challenging. There is no prior work directly comparable to this study in terms of explicitly examining the relative importance of factors underlying OA-prescribing decisions. What prior studies do show is that ED providers may make different OA-prescribing decisions based on the same data, that patient demographic factors influence prescribing decisions, and that physicians' beliefs, training, and clinical experience also play a role [19, 20, 23]. Our study shows that providers will also place unique weights on different parameters and that, for example, the importance of a patient's reported pain score will influence individual providers differently.

Limitations

The study design involved self-reporting of behaviors and therefore is susceptible to social desirability bias. Survey respondents may have unknowingly had a bias toward answering questions they interpreted as being a more desirable behavior and conversely under-reported what they interpreted as a less desirable behavior. In addition, the results may be affected by recall bias on the part of respondents when trying to answer questions about their prescribing practices. Direct measurements of behaviors were not collected.

Limitations related to questionnaire development include the possible omission of additional factors that may be important to OA-prescribing decisions. For example, the survey questionnaire did not include questions about prescription drug monitoring program use because such a program was not available to providers at the time the instrument was developed. While explicit questions about PDMP use were not included, the fact that "patient's prescription history" is among the highest-rated factors overall might suggest that the study respondents would find PDMP information helpful in their prescribing decisions. Additionally, formal reliability and validity testing of the questionnaire was not performed.

Our study may have been influenced by limitations which are inherent in survey-based studies including response and non-response bias. Finally, being a single-center study, the results may not be generalizable to the views and practices of emergency medicine providers at other centers.

Conclusion

In a single-center survey of ED providers, the self-reported importance of several factors influencing OA-prescribing decisions were significantly different among attending physicians, resident physicians, and advanced practice providers. Among all respondents, a patient's opioid prescription history and history of substance abuse or dependence were thought to be more important when making prescribing decisions than the patient's diagnosis, provider's clinical gestalt, and patient's level of distress. Further investigation into how ED providers make OA-prescribing decisions is needed to help guide interventions aimed at improving appropriate pain management and limiting drug diversion and abuse.

Compliance with Ethical Standards

Conflict of Interest The authors have no conflicts of interest to report.

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