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Outpatient provider contact prior to unintentional opioid overdose

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Abstract

Objectives—Prescribed opioid medications are the most commonly implicated substances in unintentional overdoses. Outpatient health care encounters represent a potential opportunity to intervene to reduce opioid overdose risk. This study assessed the timing and type of outpatient provider contacts prior to overdose.

Methods—This study examined all adult patients nationally in the Veterans Health Administration (VHA) who died from unintentional prescription opioid overdose in fiscal years 2004–2007 and used VHA services anytime within two years of their deaths (n=1,813). For those whose last treatment contact was in an outpatient setting (n=1,457), demographic, clinical and treatment characteristics were compared among patients categorized by the location of their last contact.

Results—33% (N=479) of those last seen in outpatient settings were seen within one week and 62% (N=910) within one month of their overdose. A substantial proportion of patients were last seen within one month of death in mental health or substance disorder outpatient settings (30% N=438). The majority of patients did not fill an opioid prescription on their last outpatient visit prior to unintentional opioid overdose.

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Conclusions—The majority of patients who died by unintentional overdose on prescription opioids were seen within a month of their overdose in outpatient settings. These settings may provide an opportunity to prevent patients from dying from prescription opioid overdoses, and interventions to reduce risk should not be limited to visits that resulted in an opioid prescription.

Introduction

Fatal unintentional overdose, also referred to as death by "poisoning," has increased substantially over the past decade, becoming the number one injury-related cause of death among adults in the United States (1). In recent years, pharmaceutical opioids have become the substance most often implicated in these overdose deaths, and prescription opioid-related deaths are now more common than cocaine-, heroin- and psychostimulant-related deaths combined (2).

A number of studies have examined individual clinical and demographic risk factors for unintentional opioid overdose. Those with comorbid psychiatric and substance diagnoses, particularly opioid use disorders, have higher rates of unintentional non-fatal drug overdose (3). Misuse of prescribed opioid medications is also common among those who died from overdose (4, 5). The risk of fatal overdose has been shown to be associated with the total daily dose of prescribed opioid (6, 7), and those prescribed high dose opioids have more comorbid pain and other medical conditions, as well as substance abuse and other psychiatric conditions (8).

Although there is increasing recognition of unintentional prescription opioid overdoses as a rapidly growing national problem, there are few interventions known to reduce risk of overdose for patient populations, aside from efforts that seek to improve prescribing practices. Recent research and implementation efforts have been based on potential strategies for intervening with individuals who have been identified as at risk for prescription opioid overdose or for improving the likelihood of survival if an overdose occurs (9–12).

Questions about how, when, and where such interventions can be targeted within health systems remain unanswered. Treatment data from individuals identified as users of a specific health system and who died of a prescription opioid overdose have the potential to aid in the understanding of prevention opportunities. Thus, to inform the design of opioid overdose prevention interventions, we examined the types of treatment settings visited by patients prior to opioid overdose death and the temporal proximity of these visits to death. We also examined how demographic and clinical characteristics, such as psychiatric and pain comorbidities, differed among patients based on treatment setting. We used data from the Veteran Health Administration, which serves a national population at higher risk for overdose (13). This integrated health system allows comparison of different outpatient treatment settings through a national electronic medical records system (13).

Methods

Study data were obtained from the Department of Veterans Affairs (VA) National Patient Care Database (NPCD) and the National Death Index (NDI). Study methods were approved by the Ann Arbor VA's Institutional Review Board.

Sample

To identify VA patients who overdosed from FY 2004–FY 2007, we first identified all individuals who used VA services based on treatment records in the NPCD during this period. We then examined whether these individuals had any record of contact with a VHA treatment provider in FY 2008 or FY 2009 and, thus, were known to be alive through the end of the observation period (end of FY 2007). NDI searches conducted for the remaining individuals with no VA utilization in FY 2008 or FY 2009 identified 1,813 unintentional opioid overdose deaths from FY 2004 to FY 2007.

Cause of death

The NDI includes national data regarding dates and causes of death for all US residents, derived from death certificates filed in state vital statistics offices. Fatal unintentional poisoning was defined using the International Classification of Diseases-10 (ICD-10) codes X42, X44, Y12, and Y14 (14). We included deaths ruled unintentional or indeterminate in intent consistent with prior studies in the study population (6).

The measure of prescription opioid overdose death was also based on the T-codes included in NDI records. We included codes representing unintentional overdose on any prescription opioid (including T codes 40.2, 40.3, 40.4). These criteria encompassed overdoses due to non-synthetic opioids (e.g., codeine, morphine, oxycodone, hydrocodone, oxymorphone, hydromorphone; code 40.2) and other opioids (ie. methadone and other opioids synthetic or semi-synthetic opioids). Heroin (T code 40.1 found in 3.9% of this sample) and other substances may also have been involved, but a prescription opioid was involved in all of the overdoses included.

To serve as comparison groups, a random sample of all veterans who died of any cause and another random sample of veterans who died from injury death (excluding unintentional overdose) between FY 2004 and FY 2007 and who had used VA services in the two years before death were also analyzed.

Demographic information

Demographic information available for each patient included age in years (categorized into 18–44 years old, 45–64 years old, and ≥65 years old), race (categorized into white, black, and unknown or other) and ethnicity (Hispanic ethnicity or other). Reliable data on other demographic characteristics (e.g., employment, salary) were not available in the present sample.

Substance use disorders and other psychiatric and medical diagnoses

Substance use disorders, other psychiatric conditions, pain and other medical diagnoses were all based on *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*) diagnostic codes (14), reflecting clinical diagnoses made by VA treatment providers during clinical encounters in the year prior to unintentional overdose death.

Specific substance use disorders examined were any diagnoses of intoxication, withdrawal, abuse, or dependence involving alcohol, cocaine, cannabis, opioids, benzodiazepines, or multiple substances, or other. The multiple substances or other category included individuals with an *ICD-9* clinical diagnosis of "polysubstance abuse" or "polysubstance dependence" as well as individuals with a rarer substance use disorder diagnosis (e.g., inhalant abuse). Participants could be diagnosed with multiple substance use disorders. Presence or absence of the following psychiatric diagnoses during the one year before overdose death was also examined: major depression, schizophrenia, bipolar disorder I or II, posttraumatic stress disorder (PTSD), and other anxiety disorders. In addition, we included multiple medical comorbidities including pain disorders. These specific conditions were selected due to the frequency for which opioids are prescribed for their treatment. Other common medical conditions (i.e., arthritis, cardiovascular disease, COPD) were also included.

Treatment utilization

Clinic stop codes in the NPCD were examined to generate indicators of care within the 12 months before death. The following indicators were utilized to reflect outpatient care received within 7, 30, and 90 days, and within the year before death: any substance use disorder treatment, any mental health treatment, any mental health or substance use disorder treatment, pain clinic treatment, primary care treatment, and any other medical treatment. The majority of the visits in the "other medical treatment" category were outpatient medical care visits in the following settings: specialty outpatient clinics, admission or screening and telephone triage. Specialty outpatient settings included any non-primary care clinical settings such as cardiology and orthopedics clinics where a patient would have had direct contact with a provider for clinical reasons. Additionally, the specific setting of care of the last visit was examined and categorized into the following mutually exclusive categories: pain, specialty outpatient, primary care, other medical, mental health, and substance use disorder clinics. Some patients received more than one type of care on the date of last visit. In order to have mutually exclusive categories, these patients were coded as having their last visit in whichever setting was least common in the sample overall. Additionally, we developed measures for number of days between last treatment contact and date of overdose death, whether a patient filled an opioid prescription on the day of last visit, and whether a patient was in opioid substitution treatment.

Analyses

We examined the treatment received in the year prior to overdose death, sub-divided by type of treatment and by the time proximity of last treatment, among individuals with any VHA contact within two years prior to death. Further analyses focused on those patients whose last contact prior to overdose death was in an outpatient setting. In this sub-sample, we first compared demographic characteristics, psychiatric and medical co-morbid conditions across

outpatient treatment locations using χ^2 tests. We also looked at differences in the percent of patients that filled an opioid on the day of last visit and 3 months, 6 month and 2 years prior to death, and proportion of patients in opioid substitution treatment across outpatient contact settings prior to overdose using χ^2 tests.

Finally, using ANOVA, we examined the average number of days between last visit and overdose death across contact settings.

Results

This study included 1,813 patients who died of prescription opioid overdose in FY04-FY07 with medical contact within 2 years of their death. Of this sample, 1,457 (80%) had contact with a VHA outpatient treatment provider within two years prior to death, which represents a sub-group that is considered to have engaged in treatment recently and were the sub-sample included in detailed analysis of demographic and clinical factors.

Among patients who were last seen in outpatient settings (N=1457), patients were seen more in mental health (26%, N=373) and primary care clinics (31%, N=453) compared to substance use disorder (8%, N=115) or pain clinics (3%, N=49) in the month before death (Table 1). In comparison, in the random sample of 111,999 patients who died from any cause in the same time period, 44% (N=48,901) were last seen in primary care and only 5% (N=5,281) were seen in mental health and 0.4% (N=448) were last seen in substance disorder clinics. In the random sample of 5,075 patients who died from other injury related causes (excluding unintentional overdose), 43% (N=2186) were last seen in primary care, 11% (N=549) were last seen in mental health and 2% (N=85) were last seen in substance disorder clinics.

Table 2 reports the demographic characteristics for the 1,457 patients who were last seen in outpatient settings prior to overdose death, with patients categorized by last treatment site. Consistent with the general VHA patient population, 92% of the sample was male. Gender and ethnicity did not significantly differ among clinic types. Distribution of patients in different age groups ($p = 0.003$) and race ($p = 0.049$) did differ by sites; patients last seen in a pain clinic tended to be younger and more likely to be White compared to patients last seen in all other sites on average.

Table 3 displays the frequency of comorbid conditions by treatment site. Overall, a substantial proportion of patients last seen in medical and mental health/substance disorder sites had pain and other medical conditions, although not surprisingly, pain conditions were even more prevalent in patients last seen in a pain clinic. With psychiatric conditions, fewer patients with any psychiatric condition were last seen in medical settings than in mental health or in substance abuse clinics. Patients with substance use disorders were more likely to have been last seen in a substance abuse clinic, but the proportion of patients with substance use disorders was similar across other settings.

Only 24% (N=98) of patients last seen in primary care, 5% (N=16) of patients last seen in mental health, and 2% (N=2) last seen in a substance abuse clinic filled an opioid prescription on the day of their last outpatient visit prior to unintentional opioid overdose

(see Table 4). Half of patients overall filled an opioid prescription 6 months. The most common opioids filled in the year prior to death include oxycodone (34%), hydrocodone (31%), and morphine (23%). In addition, 48% of this sample filled a benzodiazepine prescription in the year prior to death. Significantly more patients in substance clinic (33%) were in opioid substitution treatment compared to all other clinics.

Discussion

This study is the first to our knowledge to examine types of clinical contact prior to unintentional prescription opioid overdose death. Data from this national cohort of all patients (defined as those who had received any care in the prior two years) seen in the VA healthcare system who overdosed on prescribed opioids show that the majority of people were seen in outpatient clinic settings within 30 days prior to their overdose. This suggests that people who overdose on prescription opioids are likely to be recently engaged in treatment prior to their death; consequently, there is the potential for targeting interventions to prevent prescription opioid overdoses in the outpatient context.

It is noteworthy that a similar proportion of people were last seen in a mental health or substance disorder clinic as seen in a primary care clinic. Furthermore, the proportion of patients with comorbid substance use disorders, pain and other medical disorders, were largely similar for those last seen in psychiatric treatment as in medical treatment settings. This similarity suggests that screening individuals may be efficacious for identifying those at risk for prescription opioid overdose based on patient factors, regardless of specific treatment setting.

In addition, patients who died from unintentional opioid overdose appear to be twice as likely to be last seen in mental health clinics and four times as likely to be last seen in substance disorder clinics compared to those who died from other injury related causes. Although this finding is not surprising given the high rates of comorbid mental health and substance disorders in the unintentional overdose sample, it emphasizes that outpatient psychiatric settings may provide an important opportunity for intervention to prevent unintentional overdose.

Despite accumulating data indicating that those who overdose have high rates of psychiatric and substance use disorder diagnoses, there are no known unintentional overdose assessment or prevention interventions to date focused on patients seen in mental health settings (16). Our data show that the large group of patients with psychiatric comorbidities was more likely to be last seen in psychiatric outpatient settings. Furthermore, most of these patients did not fill an opioid prescription within the 6 months of their death in the VHA, which suggests that provider level prescribing interventions in the outpatient medical settings alone may not reach this group of patients with high psychiatric co-morbidity.

Although patients are not obtaining prescribed opioids from mental health providers in most cases, there may still be an opportunity to intervene in this setting, especially because many of those who overdose are using medications for which they were not prescribed (4, 5). In addition, psychiatric providers are frequent prescribers of medications, such as

benzodiazepines, which are commonly seen in overdose deaths and may interact with opioids to increase the risk of overdose (17). In this sample of patients, benzodiazepines, were commonly prescribed, with 48% of this sample filling a prescription in the year prior to death. Finally, psychiatric providers may be more specifically trained in psychosocial risk factors, particularly from their experiences in assessing suicide risk, which may help them better assess and discuss risk factors for unintentional overdose with patients.

These data also indicate that the majority of patients are not obtaining prescribed opioid medications from providers on their last visit prior to opioid overdose. In fact, less than 15% filled a prescription for an opioid at their last visit overall, and only 5% of the time when they were last seen in mental health. This finding suggests that it may be crucial to not only focus on screening for opioid overdose risk when a provider is prescribing or refilling an opioid medication, but also as part of routine follow-up care for those prescribed these agents. Screening may then be appropriate for all patients prescribed opioids at any outpatient visit and could focus on factors that have been associated with increased overdose risk such as dose of opioids prescribed and presence of co-morbid medical and psychiatric conditions. This would be a step towards stratifying patients by risk scores into categories in order to target interventions more appropriately.

Lastly, in contrast to psychiatric and other medical outpatient settings, specialty pain clinics seem to capture a small but unique subset of patients. Patients last seen in pain clinics have a different constellation of characteristics, including younger age, and as can be expected, a much higher likelihood of filling an opioid prescription on the day of the last visit. These patients also have significantly shorter duration between their last visit and death. They are also more likely to have pain and have lower rates of diagnosed substance use disorders. Patients in pain clinics may benefit from different screening and intervention approaches compared to patients seen in other clinics.

Limitations and further directions

There are several limitations to this study. This was a study of patients actively receiving care in the Veterans Health Administration (VHA), which is one of the largest integrated healthcare systems in this country. Our results may not generalize to a different healthcare system, although the integrated nature of the VHA creates opportunities for developing and testing prevention and intervention strategies. These results may also not generalize to Veterans who did not receive VHA care within a 2 year time frame. In addition, there has been a significant shift in overdose mortality patterns in the last several decades (18). Our results did not examine temporal trends in patterns of treatment receipt prior to opioid overdose. Recent national data indicate that unintentional overdoses, particularly for prescribed opioids, increased until 2010 (17, 18), which may or may not influence the associations reported here.

Another limitation to the present study is that we did not examine predictors of time to overdose death. In the future, if examined within specific treatment settings, such data could inform screening efforts. Furthermore, data on patients receiving opioid agonist treatment are not consistently recorded at the daily level. Thus, we may have overestimated the time until death in this group.

Conclusions

Findings from the present study indicate that outpatient clinics, particularly primary care and mental health, may provide an opportunity to identify and intervene with patients at elevated risk for unintentional prescription opioid overdose. There is an increasing body of data on risk factors for overdose among patient populations, and the present data suggest that an important next step may be to create and implement risk stratification measures for outpatient clinical settings such as primary care and mental health to identify patients at risk for prescription opioid overdose. Furthermore, interventions developed to address unintentional overdose that are tailored to the primary care and/or mental health context have the potential to have a meaningful impact on unintentional overdoses among patients prescribed opioid medications.

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Table 1

Treatment received prior to unintentional opioid overdose death by type of treatment setting and timeframe, among individuals with contact in the prior two years[1].

Treatment Received Prior to Unintentional Opioid Overdose Death	Last visit in any setting (N = 1813)		Last visit in outpatient setting (N= 1457)	
	N	(%)	N	(%)
Overall – Any Treatment or Contact				
7 days prior	556	31	479	33
30 days prior	1044	58	910	62
90 days prior	1350	74	1185	81
1 year prior	1664	92	1457	100
Any Substance disorder Treatment				
7 days prior	62	3	53	4
30 days prior	136	8	115	8
90 days prior	215	12	176	12
1 year prior	393	22	333	23
Any Mental Health Treatment				
7 days prior	168	9	154	11
30 days prior	420	23	373	26
90 days prior	678	37	602	41
1 year prior	1029	57	900	62
Any Mental Health or Substance disorder Treatment				
7 days prior	217	12	196	13
30 days prior	496	27	438	30
90 days prior	759	42	669	46
1 year prior	1102	61	962	66
Pain Clinic Treatment				
7 days prior	26	1	26	2
30 days prior	49	3	49	3
90 days prior	87	5	79	5
1 year prior	184	10	171	12
Primary Care Treatment				
7 days prior	182	10	174	12
30 days prior	502	28	453	31
90 days prior	920	51	821	56
1 year prior	1396	77	1247	86
Any Medical Contact (incl. primary care)				
7 days prior	416	23	347	24
30 days prior	872	48	741	51
90 days prior	1240	68	1078	74

Treatment Received Prior to Unintentional Opioid Overdose Death	Last visit in any setting (N = 1813)		Last visit in outpatient setting (N= 1457)	
	N	(%)	N	(%)
1 year prior	1606	89	1402	96

[1] Treatment types are not mutually exclusive.

Table 2

Demographic characteristics in patients with unintentional opioid overdose death across outpatient settings

	Total		Pain		Specialty Outpatient		Primary Care		Other Medical		Mental Health		Substance disorder		
	(N=1457)		(N=40)		(N=255)		(N=413)		(N=311)		(N=329)		(N=109)		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	p-value
Male	1,345	92	36	90	243	95	381	92	277	89	303	92	105	96	.060
Race															.049
White	1,121	77	36	90	187	73	308	75	238	77	265	81	87	80	
Black	114	8	2	5	25	10	36	9	19	6	19	6	13	12	
Unknown/Other	222	15	2	5	43	17	69	17	54	17	45	14	9	8	
Hispanic Ethnicity	47	3	2	5	8	3	14	3	11	4	8	2	4	4	.081
Age in years															.003
18–44	336	23	14	35	50	20	76	18	80	26	89	27	27	25	
45–64	1,053	72	24	60	189	74	308	75	219	70	235	71	78	72	
≥ 65	68	5	2	4	16	6	29	7	12	4	5	2	4	4	

Table 3

Comparison of pain, medical, psychiatric, and substance use disorders across outpatient treatment settings in patients with unintentional opioid overdose death.

	Total		Pain		Specialty Outpatient		Primary Care		Other Medical		Mental Health		Substance disorder		
	(N=1457)		(N=40)		(N=255)		(N=413)		(N=311)		(N=329)		(N=109)		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	p-value
Pain disorders															
Acute Pain	350	24	12	30	75	29	87	21	74	24	74	22	28	26	.192
Back or Neck Pain	755	52	35	88	132	52	228	55	167	54	153	47	40	37	<.001
Related medical conditions															
Arthritis	761	52	28	70	145	57	193	47	162	52	174	53	59	54	.029
Cardiovascular	814	56	24	60	135	53	253	61	174	56	179	54	49	45	.041
COPD	208	14	6	15	41	16	61	15	36	12	47	14	17	16	.733
Psychiatric Conditions															
Major Depression	265	18	12	30	33	13	57	14	42	14	96	29	25	23	<.001
Bipolar Disorder	193	13	5	13	23	9	39	9	37	12	74	22	15	14	<.001
PTSD	323	22	13	33	43	17	68	16	60	19	107	33	32	29	<.001
Other Anxiety Disorder	345	24	12	30	28	11	88	21	74	24	114	35	29	27	<.001
Schizophrenia	101	7	3	8	15	6	20	5	10	3	45	14	8	7	<.001
Substance use disorders															
Alcohol	376	26	6	15	53	21	88	21	70	23	95	29	64	59	<.001
Cocaine	155	11	2	5	24	9	26	6	31	10	39	12	33	30	<.001
Cannabis	105	7	2	5	19	7	18	4	16	5	31	9	19	17	<.001
Opioid	291	20	4	10	34	13	63	15	59	19	69	21	62	57	<.001
Benzos/barbiturates	59	4	1	3	3	1	12	3	12	4	12	4	19	17	<.001
Other/Polysub	340	23	6	15	42	16	75	18	63	20	89	27	65	60	<.001

Table 4

Comparisons of opioid prescriptions and time course between last visit and death across outpatient treatment settings

	Total		Pain		Specialty Outpatient		Primary Care		Other Medical		Mental Health		Substance disorder		
	(N=1457)		(N=40)		(N=255)		(N=413)		(N=311)		(N=329)		(N=109)		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	p-value
Filled opioid Rx on day of visit (%)	199	14	19	48	32	13	98	24	32	10	16	5	2	2	<.001[1]
Filled opioid from VHA 3 mths before death (%)	634	44	32	80	115	45	195	47	149	48	118	36	25	23	<.001[1]
Filled opioid from VHA 6 mths before death (%)	725	50	34	85	131	51	223	54	166	53	140	43	31	28	<.001[1]
Filled opioid from VHA 2 yrs before death (%)	969	67	38	95	182	71	274	66	216	69	203	62	56	51	<.001[1]
In opioid substitution (%)	62	4	1	3	2	1	11	3	6	2	6	2	36	33	<.001[1]
Mean days/SD between last visit & death	51±75		20±38		56±78		57±78		51±75		42±67		52±89		.007[2]

[1] p-values from χ^2 comparisons across outpatient treatment settings

[2] p-value from ANOVA comparing means across treatment settings