Referrals and Treatment Completion for Prescription Opioid Admissions: Five Years of National Data

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Abstract

This study examines sources of referral for prescription opioid admission to substance use disorder treatment facilities and their relative completion success rates using secondary analysis of an existing data set (Treatment Episode Datasets – Discharge). Five years of data from public and private treatment facilities were extracted for client discharges with no prior treatment (N = 2,909,884). Healthcare professionals account for very few referrals to treatment (<10%). Prescription opioid clients referred into treatment had lower treatment success compared to other substance clients and when referred by healthcare providers had lower success rates (OR = 0.72, 95% CI 0.70 – 0.75) than clients from other referral sources. Fewer treatment referrals for prescription opioid misuse by healthcare providers and lower success rates are significant and timely findings due to the prevalence of prescription opioid misuse. Healthcare providers are well positioned to refer early for prescription opioid misuse and continue support of their patients during treatment.

Keywords

prescription opioid; healthcare referral; substance abuse; treatment outcomes

1. Introduction

Opioid use disorder is a complex public health problem that has created major human and societal costs. In 2013 in the United States, opioid use disorder associated with prescription

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opioids affected 1.8 million Americans, and opioid use disorder associated with heroin affected 517,000 (Substance Abuse and Mental Health Services Administration, 2014). Prescription opioid (PO) misuse results in significant morbidity and mortality often due to unintentional overdose (Dunn et al., 2010). Since 2004, emergency room visits related to POs increased 153%, or over 220,000 visits (Substance Abuse and Mental Health Services Administration, 2013), and the deaths from PO overdose out-numbered death from motor vehicle accidents (Centers for Disease Control and Prevention, 2011). The growth of this problem suggests a need to investigate PO admissions to treatment and successful treatment completions. Given the importance and increasing health care contacts with PO users, it is important to understand who is currently referring those presenting with PO as a problem substance. Furthermore, it is important to understand how referral sources are associated successful treatment completion.

Successful treatment completion is a clinically meaningful outcome measure predictive of long-term outcomes such as decreased criminal involvement, fewer treatment readmissions (Evans, Li, & Hser, 2009; Garnick, Lee, Horgan, & Acevedo, 2009; Zarkin, Dunlap, Bray, & Wechsberg, 2002), employment, and income one year following treatment (Arria et al., 2003). Furthermore, successful treatment completion data is useful in public health analyses (Alterman, 2001; Garnick et al., 2009). Referral source is associated with treatment success (Arndt, Acion, & White, 2013; Atkinson, Misra, Ryan, & Turner, 2003). For example, for all substances, employer and criminal justice referrals predict the highest percentage of successful completion rates, while self-referrals and healthcare referrals (HCR) predict the lowest percentage of success (Arndt et al., 2013; Evans et al., 2009; Friedmann, Lemon, Stein, & D'Aunno, 2003; Kelly, Finney, & Moos, 2005; Perron & Bright, 2008; Wild, Cunningham, & Ryan, 2006). Coercion may be a factor for completion success rate for treatment (Wild et al., 2006). For instance, criminal justice system referrals mandate treatment and keep clients in the treatment programs longer (Perron & Bright, 2008). Longer retention in a treatment program is generally associated with better post-treatment outcomes (National Institute on Drug Abuse, 2010; Perron & Bright, 2008). However, self-referral and HCR clients are associated with lower success in treatment completion (Arndt et al., 2013). The recent Federal initiative for screening, brief intervention, and referral to treatment (SBIRT) in primary healthcare for patients misusing alcohol and illicit drugs highlighted the relevance of this investigation as SBIRT aims to increase HCRs (Urada, Teruya, Gelberg, & Rawson, 2014). While there is an urgent need for screening and intervention of PO problems, referral and treatment outcomes for clients with PO admissions is relatively unexplored.

The purpose of this study was to explore PO admissions to treatment facilities and their associated successful treatment completions. We speculated that referral rates for treatment admissions for PO use disorder by healthcare professionals (HCP) would be lower compared with other referrals sources. In addition, successful treatment completion rates for PO admissions would be lower compared with other substances. In addition, we presented descriptive data on treatment admissions identifying with PO as the primary problem substance.

2. Material and Methods

2.1 Participants and Selection

This study was a secondary analysis of an existing data set from the Substance Abuse and Mental Health Services Administration. Admission and discharge information is requested from all public and private, urban and rural county addictions treatment facilities receiving public funding in the United States. These data were drawn from the Treatment Episode Datasets – Discharge (TEDS-D). TEDS consists of approximately 1.5 million annual admissions to licensed substance abuse treatment facilities making up a major proportion of all treatment admissions in the 50 states. Thus, results from TEDS are generalizable to those in licensed substance abuse treatment facilities. We used a concatenated 2006–2009 dataset (United States Department of Health and Human Services, 2009) and the 2010 dataset (United States Department of Health and Human Services, 2010) providing 5 years of discharge data (N = 8,096,795). TEDS-D data is collected on all admissions/discharges rather than each individual. We selected only those records where the client indicated no prior treatment (N = 3,014,422) to capture only first-time admission for analysis of individuals rather than multiple records for one person. Clients receiving medication assisted opioid therapy (e.g., methadone) were excluded resulting in our final analytic sample (N = 2,909,884). Medication assisted opioid therapy is viewed by some researchers (Bluthenthal, Jacobson, & Robinson, 2007; Guerrero et al., 2013) as an ongoing, indeterminate treatment that can misrepresent retention outcomes. Because these were secondary analyses of de-identified data, the University of Iowa Human Subjects Office, IRB exempted this study from review.

2.2 Measures

The main outcomes were successful substance abuse treatment completion status at discharge, and length of stay. TEDS data include demographic information and treatment characteristics collected on admission by agency staff. Continuous variables such as age were categorized due to confidentiality concerns. Participants were mostly male. Race/ethnic groups were determined by self-report and combined into White (non-Hispanic/Latino ethnicity), Black (Black/African American regardless of ethnicity), Hispanic (Puerto Rican, Mexican, Cuban, Central or South American or any other Spanish cultural origin), and Other (Native American, Asian, or other racial groups). Participants were categorized to either a POs group or Other Substance group (including heroin and alcohol). The PO group, our primary independent variable, consisted of admissions coded with "other opiates and synthetics" as their primary problem substance by TEDS. The "other opiates and synthetics" category include buprenorphine, codeine, Hydrocodone, hydromorphone, meperidine, morphine, opium, oxycodone, pentazocine, propoxyphene, tramadol, and any other drug with morphine-like effects. The PO group may consist of those misusing prescriptions or illegally obtained POs. Referral source was a major factor in our analyses. For one set of analyses, referral source was divided into HCR group (physician, psychiatrist, other licensed HCP, general hospital, psychiatric hospital, mental health program, or nursing home) or Other (individual/self, alcohol/drug abuse care providers, school/educational settings, employers/EAPs, courts/criminal justice agencies, and other community referrals).

The primary outcome variable of successful treatment completion was originally coded into several categories by treatment agency staff, and reduced to fewer subcategories by TEDS. We dichotomized successful treatment completion as "Treatment Completed" versus all other reasons (e.g., left against professional advice, terminated by facility, incarcerated, transferred, other). The secondary outcome of Length of stay was defined by month-long intervals. Due to varied ranges provided by TEDS, frequencies in this analysis are in 1-month intervals and include discharges throughout the interval. Discharges were categorized in between 1 and 30 days were categorized as 1 month. Discharges between 31 and 60 days were categorized as 2 months, and so on.

2.3 Statistical Analysis

Basic chi-square was used to analyze differences between categorical variables. Logistic regression and estimated marginal probabilities (expressed as percentages) for multivariate analyses, predicted PO admission or referral from HCPs and successful treatment completion. Effect sizes were calculated using the probabilistic index (PI) and odds ratios (OR). A PI of 0.5 is the base and indicates no effect whatsoever, a PI < 0.56 is small, < 0.64 medium, and 0.7 is large (Acion, Peterson, Temple, & Arndt, 2006). Small differences would be considered statistically significant using $p < 0.05$. Because of the very large sample size and number of tests, the threshold for significance was set to 0.0001 to avoid a type I error. Risk differences greater than 5 percentage points were considered clinically meaningful measures of effect as were odds ratios greater than 2.0. Previous research has followed this effect size threshold in analysis of TEDS data (Sahker, Toussaint, Ramirez, Ali, & Arndt, 2015).

3. Results

3.1 Demographic data

Clients with primary substance as PO were more likely female and white when compared to the "other substance" group. Among the other substances group, Blacks and Hispanic/Latinos were almost 5 and 4 times more likely, respectively. Nearly 44% of those admitted for POs were between the ages of 21 and 29 in contrast to those among the other substances group where only 27.65% were in this age interval. There were fewer younger and older clients in the PO group than in other substances group. While there was an overall significant difference in age (Mann-Whitney z = 7.73, p < 0.0001) the effect size was trivial (PI < 0.51). The people with PO admissions were more often unemployed, retired or disabled, living independently, currently married and less often supporting themselves from wages and salary in comparison to the other substance group.

3.2 Referral Sources

Substance use treatment information appears in Table 1 comparing the PO and other substance groups. The PO group had considerably more self-referrals and fewer criminal justice referrals compared to the other substances. While there were more HCR among the PO admissions (chi-square = 3,664.55, df = 1, p < 0.0001) the difference of 3.78 percentage points missed our criterion of 5.0 to be considered clinically meaningful. HCR were generally low in both groups (PO and other substances) and were only slightly less than 10%

for the PO clients. Figure 1 shows the number of HCPs and other referral source admissions by age group where POs were the primary problem substance.

The HCR versus other referrals, for PO admissions were analyzed by age, race, gender, and employment status. Demographic differences between HCRs and other referral sources among the PO admissions (Table 2) showed marginally more females among the referrals coming from healthcare. HCRs were also somewhat older (Mann-Whitney z = −19.66, p < 0.0001). The racial make-up of the two referral groups, HCR or other referrals, were very similar although there were slightly more whites among the HCR (chi-square = 4772, df = 1, p < 0.0001). Moreover, while statistically significant, there were few differences in employment status. The largest differences occurred in the reasons the client was not in the labor force. For example, admissions from HCR more often included those who were retired, disabled, or not in the labor force due to other reasons. HCRs were less common for those reporting no income or were in dependent living situations compared to other referral sources. HCRs were more likely to occur for those living independently.

3.3 Treatment service setting

The most common setting for treatment services for all referral types and all substances was outpatient treatment, however, fewer clients from HCRs and PO admissions were referred there (Table 3). Compared to other referral sources, HCR clients were more often placed in short-term, long-term, or 24-hour residential detoxification settings. Compared to other substance clients, PO clients were more likely to be detoxified in a free standing, 24-hour detoxification setting, and more likely to be admitted to short-term residential treatment (<30 days).

3.4 Discharge status

Successful discharge from treatment indicates the client completed all the components of the program. There were important differences in 1) the success rates for PO admissions compared to other substances and 2) the success rates for HCRs compared to other referral sources.

Considerably fewer clients in the PO group were successfully discharged from treatment (chi-square = 3,815.43, df = 1, p < 0.0001) as compared to other substances. However, the relative increased number of clients transferred for additional treatment (e.g., after a detoxification program) may have contributed to this difference. Even so, there were lower treatment success rates for PO admissions compared to other substance clients in each service setting, as shown by stratified analyses. For example, among hospital detoxification clients, 63.9% of PO clients successfully completed compared to 74.4% of other clients. Among ambulatory, non-intensive outpatient treatment, 26.8% of PO clients successfully completed in contrast to 45.1% of those clients presenting with other substances. Thus, the PO clients had lower success rates across all treatment service settings.

PO clients referred into treatment by HCPs had lower success rates than clients from other referral sources. Table 4 shows discharge outcomes for PO admissions from HCR versus other sources. Using logistic regression, predicting successful completion from referral source showed a highly significant difference (OR = 0.72, 95% CI 0.70 – 0.75, Wald z =

16.6, p < 0.0001) with HCRs showing a lower success rate than the other referral sources. The estimated reduction in successful discharges from HCRs was a 7.43 percentage points (95% CI: 6.59 – 8.27). A follow-up logistic regression was done controlling for client sex, age, race/ethnicity, employment status, primary source of income, living arrangement, marital status, age of first use, geographical location of service (state), and service setting. HCRs continued to show a lower successful completion rate (OR = 0.84, 95% CI: 0.79 – 0.89, Wald z = 6.14, p < 0.0001) although the effect was attenuated. The covariate adjusted success rate for HCRs was 37.2% and for other referral sources was 41.4%, a difference of 4.17 percentage points (95% CI: 2.8 – 5.5).

Length of stay was also shorter for those referred by HCPs (Mann-Whitney z = 9.10, p < 0.0001) compared to all other sources, however, this comparison was complicated by the differences in service settings. Stratified analyses within each service setting produced significant differences in all situations. However, HCR admissions tended to stay longer in detoxification settings than clients referred from other sources. In all other settings, HCR clients stayed a shorter period.

4. Discussion

Analysis of admissions into treatment for problems with PO use provided important findings. These findings included (1) few referrals came from HCPs, (2) white and female clients had a higher percentage of admissions for PO use than other substances, (3) the completion success rates for PO admissions was lower than other substance admissions.

Less than 10% of PO treatment admissions came from HCRs, whereas the largest source was self-referrals (47%). The low percentage of HCR was consistent with findings from a study of older adults admitted for SUD treatment (Arndt, Clayton, & Schultz, 2011). Furthermore, the current study showed lower successful completion rates associated with HCRs, which may have been because HCR sources favored short-term detoxification settings rather than the more commonly directed outpatient treatment (See Table 2). The preference for shorter recovery programs by healthcare professionals may be potentially associated with the poorer outcomes observed in HCRs. Further research could investigate HCR to longer term, more intensive outpatient programs by and PO treatment services across referral sources. Overall, there is a general lack of understanding of SUD and its treatment throughout the healthcare system which may be the reason screening for SUD does not occur in a consistent manner (Lawrence, Rasinski, Yoon, & Curlin, 2013; Swenson-Britt, Carrougher, Martin, & Brackley, 2000). In a study of over 23,000 adults receiving health maintenance examinations, one in six patients reported HCPs spoke to them about alcohol use (Arndt, Schultz, Turvey, & Petersen, 2002). This small number of physician discussions for alcohol may mean even lower numbers for PO discussions. Future research on PO physician interventions and discussions would further improve the current understanding.

Criminal justice (19.9%) referral for PO use disorder was lower than for other substances (47.43%), however, illegal PO use is more difficult to determine (SAMHSA, 2013). Additionally, self-referral into treatment for misuse of POs was comparatively high (47%).

High self-referrals and lower treatment completion supports existing research suggesting coercion increased treatment completion (Wild et al., 2006).

The demographics of those admitted into treatment for PO use disorder compared to other substances indicated they were predominantly White, in their late 20s, never married, and lived independently. The gender makeup for PO admissions to treatment was about 50/50 male/female compared to a 2-to-1 ratio for all other substances. The current gender makeup supports previous findings of PO dependence (Back, Lawson, Singleton, & Brady, 2011; Parsells Kelly et al., 2008). Furthermore, women were more likely than men to report their first exposure to PO (Back et al., 2011; Maremmani et al., 2010; McHugh et al., 2013), be prescribed PO (Campbell et al., 2010; McHugh et al., 2013; Pokela, Simon Bell, Lihavainen, Sulkava, & Hartikainen, 2010; Sadowski, Carrie, Grymonpre, Metge, & St John, 2009), and experienced PO overdose deaths (Centers for Disease Control and Prevention, 2013). These finding support the need for a greater focus on women and PO prescription, misuse, and now, treatment outcomes.

These data have limitations of note. First, some data were collected from self-report, this affects validity. For example, clients may have actually been referred by health care sources, but upon admission to a treatment facility, they reported self-referral. Unfortunately this cannot be accounted for in these data. Second, the present study measured successful treatment completion and length of stay as the outcome measures. Improved measures of treatment success as an outcome variable could investigate substance use and abstinence data beyond treatment. Future research should focus on longitudinal designs. Third, an interaction between successful treatment completion and referral source or secondary problem substances was not hypothesized a priori. Through exploring the data, an interesting association between HCR and PO admissions was found. Future research could investigate the moderating effects of referral source and other problem substances on PO treatment completion. Fourth, there is an important distinction between PO misuse arising from a legitimate prescription for a pain condition, versus abuse arising from street acquired PO pills. Unfortunately, this distinction cannot be drawn from the data and is needed to be investigated in future PO studies. Fifth, TEDS defines transfers as, "Client was transferred to another substance abuse treatment program, provider or facility within an episode of treatment." This may include transfers to either greater or lesser levels of care. Ultimately, transfers are unclear and unstandardized, thus, including transfers in the successful category may misrepresent total successful completion. Those transferred out of a facility, are not counted as additional treatment episodes as the current study includes only first time episodes. Counting transfers as successful completions may misrepresent "success" across different states. Finally, some admissions in the TEDS database depended on external factors such as public fund availability. States might have used their funds to target specific groups such as pregnant women and adolescents. These admissions may not have captured all substance abuse treatment admissions. However, the TEDS database attempts to include all admissions to any provider that receives public funding. Another limitation involved individuals' self-report for several of the variables, which may have affected the reliability and validity of the data.

5. Conclusions

The clinically meaningful findings of low HCP referral rates and low treatment success for those with PO use disorder identified a major gap in care and treatment delivery. Possible solutions include (1) HCPs universally and routinely screen for PO misuse, especially when prescribing opioids for pain, and early referral to treatment when objective findings through screening indicate high risk for misuse, (2) maintaining client, substance abuse treatment and healthcare team relationships once the client is in treatment.

Finally, HCPs can improve care by focusing on PO misuse among women. Given the sharp rise in deaths related to PO misuse in women (Centers for Disease Control and Prevention, 2013) and findings of HCPs prescribing PO more for women (Campbell et al., 2010; McHugh et al., 2013; Pokela et al., 2010; Sadowski et al., 2009), there is a need for thorough evaluations of pain symptoms and risks such as past year substance use of other drugs and serious mental health conditions (Tetrault et al., 2008). If POs are needed for the management of pain, monitoring through evidenced based screening and monitoring tools and frequent healthcare encounters, drug screenings, and medication management may result in safe and effective care.

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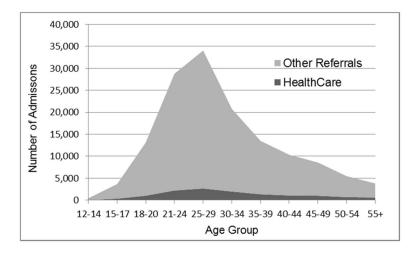
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Fig. 1.
Number of opioid admissions by referral source and age group.

Table 1

Treatment Characteristics of Prescription Opioid and Other Drug Discharges

	Other Substance %	Prescription Opioids %
	(n = 2,764,846)	(n = 145,038)
Referral Source[***]		
Individual, Self	24.91	**47.00**
Alcohol/Drug Abuse	6.29	11.71
Healthcare Professional	5.40	9.18
School (Educational)	2.27	0.37
Employer/EAP	0.86	0.87
Other Community Referral	12.83	10.90
Criminal Justice	47.43	**19.96**
Service Setting[***]		
24 Hour Detox Hospital	0.72	2.05
24 Hour Detox Residential	11.54	**24.59**
Rehab Hospital	0.31	0.55
Rehab Short-Term	9.39	**16.87**
Rehab Long-Term	7.05	6.28
Intensive Outpatient	13.41	12.77
Non-Intensive Outpatient	56.97	**34.71**
Ambulatory Detoxification	61	2.17
Discharge Reason[***]		
Treatment Completed	46.91	**38.61**
Left Against Advice	24.11	25.37
Terminated by Facility	6.49	6.28
Transferred	14.49	**20.78**
Incarcerated	1.69	1.16
Death	0.19	0.30
Other	6.12	7.49
Length of Stay[***]		
Up to 30 Days	37.70	**62.76**
31–60 Days	15.93	12.33
61–90 Days	11.39	7.05
91–120 Days	9.63	5.13
120 or More Days	25.35	**12.73**
Length of Stay Successful Clients[***]		
(N=1,353,013)	(n = 1,297,017)	(n = 55,996)
Up to 30 Days	31.79	**63.43**
31–60 Days	13.31	10.45
61–90 Days	11.22	**6.16**
91–120 Days	11.50	**5.18**

	Other Substance %	Prescription Opioids %
	(n = 2,764,846)	(n = 145,038)
120 or More Days	32.18	**14.77**

Note.

***
p<.0001, χ^2 test for difference; Bold, clinically meaningful difference of 5% or greater

Table 2

Prescription Opioid Group Referral Source and Demographic Discharge Characteristics

	Other Referral %	Healthcare Referral %
	(n = 131,951)	(n = 13,087)
Gender***		
Male	51.71	47.47
Female	48.29	52.53
Age***		
12–14	0.33	0.27
15–17	2.60	2.78
18–20	9.35	7.89
21–24	20.45	16.96
25–29	24.18	20.34
30–34	14.49	15.15
35–39	9.38	10.33
40–44	7.15	8.27
45–49	5.86	7.83
50–54	3.70	5.45
55 +	2.50	4.72
Race/Ethnicity***		
White	86.04	88.22
Black	4.19	2.94
Hispanic	6.42	5.20
Other	3.34	3.64
Employment Status***		
Full-Time	17.28	17.95
Part-Time	7.17	7.91
Unemployed	41.51	43.06
Not in Labor Force	34.04	31.09
Detail Not in Labor Force***		
Homemaker	7.46	9.73
Student	11.35	13.18
Retired/Disabled	21.69	**37.24**
Inmate of Institution	6.77	**0.67**
Other	52.72	**39.17**

Note.

*** p<.0001, χ^2 test for difference; Bold, clinically meaningful difference of 5% or greater

Table 3

Prescription Opioid Group Referral Source and Demographic Discharge Characteristics (continued)

	Other Referral %	Healthcare Referral %
	(n = 131,951)	(n = 13,087)
Income/Support[***]		
Wages/Salary	30.92	32.78
Public Assistance	4.09	5.99
Retirement/Pension	5.27	9.42
Other	25.28	23.79
None	34.44	**28.02**
Living Arrangements[***]		
Homeless	5.87	6.49
Dependent Living	17.93	**11.74**
Independent Living	76.21	**81.77**
Marital Status[***]		
Never Married	54.34	**49.16**
Now Married	23.00	26.75
Separated	5.87	7.05
Divorced/Widowed	16.79	17.05
Age at First Use[***]		
11 and Under	1.36	1.92
12–14	6.55	6.32
15–17	18.62	16.85
18–20	21.15	18.24
21–24	17.67	15.62
25–29	14.05	14.07
30–34	7.97	9.24
35–39	5.20	6.21
40–44	3.62	4.96
45–49	2.17	3.46
50–54	1.05	1.97
55 +	0.59	1.15
Service Setting[***]		
24 Hour Detox Hospital	2.92	1.97
24 Hour Detox Residential	21.92	24.86
Rehab Hospital	1.37	0.47
Rehab Short-Term	12.19	**17.34**
Rehab Long-Term	3.86	6.52
Intensive Outpatient	13.13	12.73
Non-Intensive Outpatient	42.53	**33.94**
Ambulatory Detoxification	2.07	2.18

Note.

***
p<.0001, χ^2 test for difference; Bold, clinically meaningful difference of 5% or greater

Table 4

Prescription Opioid Group Referral Source and Outcomes

	Other Referral %	Healthcare Referral %
	(n = 131,951)	(n = 13,087)
Discharge Reason[***]		
Treatment Completed	39.28	**31.85**
Left Against Advice	24.85	30.65
Terminated by Facility	6.32	5.92
Transferred	20.61	22.41
Incarcerated	1.21	0.68
Death	0.29	0.39
Other	7.43	8.10
Length of Stay[***]		
Up to 30 Days	62.67	63.61
31–60 Days	12.20	13.69
61–90 Days	7.09	6.64
91–120 Days	5.17	4.71
120 or More Days	12.87	11.35

Note.

[***] $p<.0001$, χ^2 test for difference; Bold, clinically meaningful difference of 5% or greater