

Health care utilization and costs associated with nonadherence to a chronic opioid regimen

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ABSTRACT

Background: Appropriate opioid use is essential for chronic pain management. Opioid misuse, abuse, or use of nonprescribed or illegal drugs could indicate or contribute to inefficient health care resource use. **Objective:** Determine whether opioid utilization and related health care use or costs differ between patients who are adherent to an opioid regimen and those who are not. **Methods:** Patients with long-term prescription opioid use (>120 days' supply over 6 months) were identified in a managed care claims database and then matched to a database of urine drug-monitoring test results. Based on monitoring results, adherent and likely-nonadherent (drug absent, drug level high or low based on a proprietary algorithm; or presence of nonprescribed or illegal drugs) cohorts were formed. Between-cohort comparisons of health care utilization and costs were made based on the 6 months prior to testing (baseline) and 12 months of follow-up. **Results:** Adherent (n=442) and nonadherent (n=1658) cohorts did not differ with regard to age, sex, or region. During the baseline period, hydrocodone and oxycodone were the most commonly filled opioids in both cohorts. Fentanyl was more common among adherent patients than nonadherent patients (P=0.014). Mean total follow-up health care costs were greater for nonadherent patients (\$26,433 vs \$23,160; P=0.036). During follow-up, nonadherent patients had more opioid dispensings (20.7 vs 18.2; P<0.001) and greater days' supply (415 vs 392; P=0.004). They were more likely to have a hospital admission (24.3% vs 19.5%; P=0.032), an emergency visit (46.2% vs 39.1%; P=0.008), or an opioid-related emergency visit (2.2% vs 0.7%; P=0.039). The mean number of hospital admissions did not statistically differ between cohorts, but nonadherent patients had a greater number of overall (2370 vs 1753 days per 1000 patients), and pain-related (1008 vs 724 days per 1000 patients) hospital days (P<0.001). **Conclusions:** Patients who were nonadherent to an opioid regimen had evidence of greater costs and health care utilization than adherent patients. Specifically, the nonadherent cohort had evidence of greater opioid use and more pain-related and overall hospital days. A greater proportion of nonadherent patients had emergency visits and hospital admissions. Further investigation of this population might reveal means to both improve adherence and reduce health care resource use.

INTRODUCTION AND OBJECTIVE

In contrast to acute episodes of pain, chronic pain ceases to serve a protective purpose, is persistent, and disrupts normal living.¹ Opioid medications are often prescribed for chronic pain management.^{2,3} Opioid regimen underuse or overuse, or other nonadherent behaviors such as use of unprescribed controlled drugs or illegal drugs could contribute to inefficient use of health care resources for pain management.

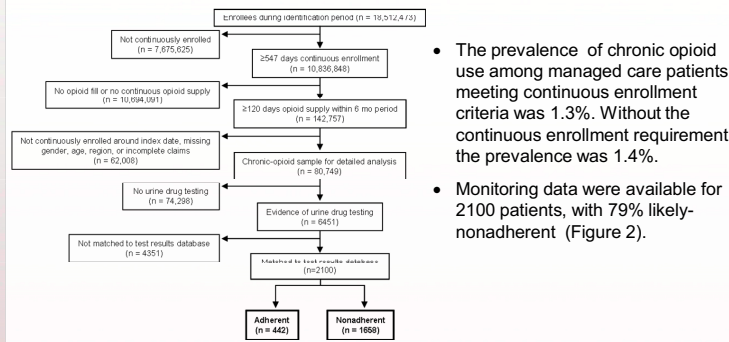
This study was initiated in order to inform our knowledge of chronic opioid therapy use among managed care patients in the U.S. We were interested in determining whether nonadherence according to urine monitoring results contributed to health care resource use and costs.

MATERIALS AND METHODS

- Retrospective, managed care claims-based analysis of patients with evidence of long-term prescription opioid use (>120 days supply over 6 months) during the period 01 Jan 2006 through 30 Sept 2007.
 - Included geographically diverse commercial, Medicare Advantage, and Medicaid health plan members.
 - Patients were required to have 18-months of continuous health plan enrollment.
- Patients with chronic opioid use and claims-based evidence of urine drug monitoring services were identified and matched to a database of monitoring test results.
 - Results from the first monitoring test after identification as a chronic opioid-user (index test) were used to determine adherence to the prescribed opioid regimen.
 - A proprietary algorithm was applied to determine whether urine levels of the prescribed opioid or metabolite were in an expected range. Whether the prescribed opioid was absent and whether unprescribed controlled drugs or illegal drugs were present was also determined.
 - Patients with testing results inconsistent with expectations based on the prescribed opioid regimen were classified as likely-nonadherent.
- The 6-month period prior to the index monitoring test was defined as the baseline period.
- Health care utilization and costs were compared between the cohorts using t-tests, Mann Whitney-U tests, or chi-square tests, depending on the distribution of the measure.

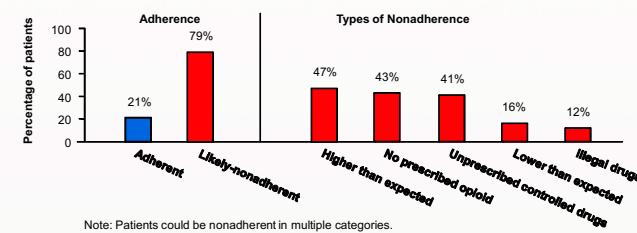
RESULTS

Figure 1. Identification of chronic opioid users and classification of adherence



- The prevalence of chronic opioid use among managed care patients meeting continuous enrollment criteria was 1.3%. Without the continuous enrollment requirement, the prevalence was 1.4%.
- Monitoring data were available for 2100 patients, with 79% likely-nonadherent (Figure 2).

Figure 2. Distribution of monitoring test results



Note: Patients could be nonadherent in multiple categories.

Table 1. Baseline characteristics of adherent vs likely-nonadherent patients

	Adherent (n = 442)		Likely-nonadherent (n = 1658)		P-value
	n	%	n	%	
Age group					
0-17 years	0	0.0	0	0.0	0.651
18-44 years	174	39.4	685	41.3	
45-64 years	261	59.1	953	57.5	
≥65 years	7	1.6	20	1.2	
Female	254	57.5	981	59.2	0.518
Insurance type					
Commercial	433	98.0	1581	95.4	0.044
Medicare Advantage	5	1.13	51	3.1	
Medicaid	4	0.9	26	1.6	
Region					
Northeast	16	3.6	74	4.5	0.209
Midwest	75	17.0	235	14.2	
South	288	65.2	1148	69.2	
West	63	14.3	201	12.1	
Mental health benefit	423	95.7	1602	96.6	0.354
	Mean	SD	Mean	SD	
Charlson-Quan comorbidity score	0.49	0.92	0.61	1.08	0.016
Unique medications	9.4	5.9	10.9	6.4	<0.001
Total medication dispensings	28.1	18.1	33.7	20.8	<0.001
Opioid dispensings	8.8	5.4	10.4	5.9	<0.001
Days' supply of opioids	171.3	77.6	194.8	89.4	<0.001

RESULTS (cont.)

Opioid prescriptions

- Subgroups receiving fentanyl or tramadol had the highest percentages of adherent patients, and the percentages of likely-nonadherent patients were greatest among patients receiving methadone or morphine (Table 2).
- Hydrocodone and oxycodone were the most frequently filled opioids (Table 2).

Table 2. Baseline distribution of pain medications among chronic opioid-users with urine monitoring results (n = 2100)

	n	% on medication in adherent cohort	% of all tested patients	P-value ^a
Fentanyl	412	25.5	19.6	0.014
Tramadol ^b	286	24.5	13.6	0.126
Hydromorphone	127	22.8	6.0	0.610
Propoxyphene	181	21.0	8.6	0.985
Hydrocodone	1258	19.4	59.9	0.023
Oxycodone	1127	18.2	53.7	<0.001
Codeine	98	16.3	4.7	0.240
Meperidine	69	15.9	3.3	0.290
Morphine	404	15.3	19.2	0.002
Others ^c	70	12.9	3.3	--
Methadone	261	12.6	12.4	<0.001

^aChi-square test comparing medication use between adherent and likely-nonadherent patients.

^bCentrally-acting analgesic.

^cIncludes suboxone, naloxone, butorphanol, nalbuphine, buprenorphine, dihydrocodeine, opium, levorphanol, pentazocine.

Twelve-month health care utilization

- During follow-up, the number of opioid dispensings and days' supply of opioids was greater among likely-nonadherent than adherent patients (Table 3).
- The number of health care visits was high for chronic opioid users—approximately 33 ambulatory visits per patient in the follow-up period—but no significant differences were observed between the adherent and likely-nonadherent cohorts (Table 3).
- Likely-nonadherent patients spent 35% more days in-hospital than adherent patients (Table 3).

Table 3. Opioid use and number of health care visits per patient during the 1-year follow-up period

	Adherent			Likely-nonadherent			P-value
	Mean	SD	Median	Mean	SD	Median	
Opioid dispensings	18.2	8.6	16.0	20.7	11.1	19.0	<0.001
Days' supply of opioids	391.8	146.3	390.0	414.9	169.0	405.0	0.004
Ambulatory visits	32.3	20.3	26.0	33.3	23.0	28.0	0.417
Emergency visits	1.6	6.2	0.0	1.7	4.0	0.0	0.805
Hospital admissions	0.3	0.9	0.0	0.4	0.9	0.0	0.109
	Days/1000 patients			Days/1000 patients			
Hospital days (all)	1753			2370			<0.001
Pain-related hospital days ^a	724			1008			<0.001
Opioid-related hospital days ^b	407			172			<0.001

^aBased on claims with primary diagnosis codes for pain, pain-related conditions, pain medications, or pain-related services and procedures.

^bBased on claims with primary diagnosis codes for opioid abuse/dependence, accidental opioid overdose or poisoning, physician-administered opioids, and opioid testing.

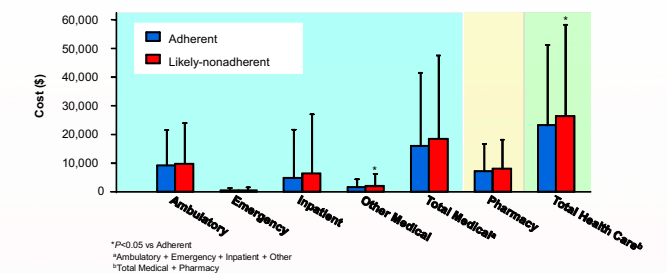
Poster presented at the AMCP 22nd Annual Meeting and Showcase, San Diego, CA, April 7-10, 2010.

RESULTS (cont.)

Twelve-month health care costs

- As shown in Figure 3, total health care costs were significantly greater for likely-nonadherent patients (\$26,433 vs \$23,160; P = 0.036).

Figure 3. Mean health care costs in the 1-year follow-up period



^aP<0.05 vs Adherent
^bAmbulatory + Emergency + Inpatient + Other
^cTotal Medical + Pharmacy

DISCUSSION

- The prevalence of chronic opioid use in this U.S. managed care population was approximately 1.3%, which is similar to that presented in previous reports.^{4,5}
- Nonadherence was high among chronic opioid-users. The percentage of likely-nonadherent patients was greatest among those receiving methadone or morphine compared with other opioid prescriptions. Adherence was highest among patients receiving fentanyl or tramadol.
- Likely-nonadherent patients were 14% more expensive than adherent patients, and had significantly more opioid dispensings, days' supply of opioids, and hospital days.
- With regard to identifying aberrant usage patterns among patients on chronic opioid therapy, urine testing results provide information complementary to that provided by pharmacy dispensings.
- A limitation of this analysis is that the adherence definition relies on the information provided to the testing facility regarding the opioid regimen, and discrepancies would affect the determination of abnormal levels of the prescribed opioid or inappropriate use of other prescription drugs.
- Additional research is needed to determine whether feedback provided by monitoring helps to guide care in practice or directly reduces costs.

CONCLUSION

Most chronic opioid-users receiving urine drug testing are likely to be nonadherent. Our data suggest that opioid prescription nonadherence is associated with a greater number of pharmacy dispensings and elevated health care costs. Identifying and addressing reasons for nonadherence could improve care and reduce costs generated by patients with chronic pain.

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