ORIGINAL ARTICLE

Increasing prevalence of prescription opiate misuse over time among rural probationers

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ABSTRACT

Prescription opiate misuse is a major public health issue, especially in rural areas. The purpose of this analysis was to examine trends in prescription opiate misuse over time in a cohort of community-based rural probationers. Participants (N = 800), recruited over a four-year period, were divided into cohorts according to the year in which they were interviewed. Prescription opiate misuse increased significantly between 2001 and 2004 ($p < 0.001$). After adjustment for changes in demographic characteristics of the cohorts, misuse of prescription opiates was still significantly greater in 2004 compared with 2001. These data suggest changes in drug use patterns among community-based rural probationers from street to prescription drugs. Implications of the findings are discussed.

Key words: opiate misuse, prescription opiates, recreational drugs, rural communities, probationers

INTRODUCTION

Nonmedical use and misuse of prescription opiates has emerged as a major public health problem in recent years.[1] Prescription opiates are second only to marijuana in terms of the number of users who meet abuse or dependence criteria, and the incidence of nonmedical prescription opiate use has increased four-fold since 1980.[2,3] Particularly noteworthy is the intense media coverage that has surrounded OxyContin and reports of dependence, overdose, and diversion related to that substance.[4,5] In addition, government and media reports have indicated that prescription opiate misuse is at epidemic levels in the rural Appalachian regions of Kentucky, Virginia, and West Virginia.[6,7] In fact, in the most recent National Survey on Drug Use and Health, Kentucky ranked first in the number of nonmedical users of prescription opiates ages 12 and older.[8] However, few clinical or epidemiologic data have appeared in the scientific literature characterizing the epidemic. Further, it is unknown whether the prevalence of prescription opiate misuse continues to increase or has leveled off.

More than 4 million Americans are on probation; these individuals make up the largest segment of the criminal justice population, which includes those in prison and on parole.[9] In addition to criminal involvement, probationers are more likely to be drug dependent than members of the general population[10]; however, there is a dearth of literature on drug use by rural probationers. In one of the few published studies, Oser and colleagues[11] noted that drug use was highly prevalent among probationers in Appalachian Kentucky. This is noteworthy, given the subjects were recruited into the study based on their status as probationers, not drug users.

This analysis examined misuse of prescription opiates over time in successive cohorts of community-based rural probationers recruited for participation in a randomized intervention. The purpose of this study was to determine whether changes in misuse of prescription opiates suggested an isolated phenomenon or a secular change from predominantly illicit to prescription drug misuse.

METHODS

Subjects were participants in a National Institute on Drug Abuse (NIDA)–funded study of a brief, randomized HIV intervention for rural probationers. Eligible participants were males and females over the age of 18 who resided in one of 30 target rural or Appalachian Kentucky counties. Participants were eligible regardless of their drug use history, although it should be noted that these probationers were at high risk for drug use/abuse.

A total of 800 rural felony probationers were recruited over a four-year period (2001 to 2004). Study methods are described in greater detail elsewhere.[11] Briefly, after consenting to participation, subjects filled out an interviewer-administered questionnaire that ascertained data pertaining to demographics, drug use, criminal history, and healthcare utilization; the questionnaire was followed

Table 1. Demographic characteristics and drug use among probationers by year								
	2001 Cohort n = 120		2002 Cohort n = 159		2003 Cohort n = 267		2004 Cohort n = 254	
Age, median (IQR) (years)	32.3 (25 to 42.1)		33.2 (25.1 to 41.1)		31.6 (24.7 to 39.7)		32.7 (25.9 to 41.1)	
Education, median (IQR) (years)	11 (8.25 to 12)		11 (9 to 12)		11 (11 to 12)*		11 (9 to 12)	
	n	percent	n	percent	n	percent	n	percent
Male	85	70.8	112	70.4	185	69.3	150	59.1*
Caucasian	107	89.2	153	96.2*	253	94.8	248	97.6**
Married	40	33.3	51	32.1	90	33.7	77	30.4
Recent drug use[1]								
Prescription opiates	32	26.7	40	25.2	106	39.7*	112	44.1**
Benzodiazepines	37	30.8	39	24.5	110	41.2	98	38.6
Cocaine	38	31.7	31	19.5*	85	31.8	68	26.8
Heroin	1	0.8	2	1.3	7	2.6	4	1.6
Marijuana	63	52.5	72	45.3	153	57.3	139	54.7

[1] In the three months prior to most current arrest; * $p < 0.05$ compared to 2001; ** $p < 0.01$ compared to 2001;
IQR = interquartile ratio.

by the HIV-risk-reduction intervention. HIV serostatus was assessed using OraSure (Bethlehem, PA), and pre- and post-test counseling was conducted in accordance with Centers for Disease Control and Prevention standards two weeks post-baseline.[8] Participants randomized to the study condition received an enhanced HIV intervention, while those randomized to the control condition received the NIDA Standard Intervention.[12] The study was approved by the institutional review board at the University of Kentucky.

Participants were recruited from rural probation offices in 30 rural or Appalachian counties encompassing two probation districts. While all of the sample counties are below the US poverty level, 19 of the 30 (63 percent) were classified as "distressed" by the Appalachian Regional Commission (ARC), indicating that the three-year unemployment and poverty rates for the county are at least 150 percent of the US average, and the per capita market income is 67 percent or less of the US average. The other 11 counties were considered to be "at risk" by the ARC, which is defined as having unemployment and poverty rates 125 percent of the US average and a per capita market income of 67 percent or less of the US average.[13]

Variable definitions

The dependent variable of interest was recent prescription opiate misuse. Specifically, participants were asked, "About how often did you use other, nonprescribed opiates (not injected or heroin, but street methadone, morphine, Dilaudid, Darvon, Demerol, Percodan, codeine) in the last three months on the street before you were arrested on the charge that resulted in this probation?" A similar question was posited for OxyContin. These questions were combined to form a variable indicating any prescription opiate misuse in the three months before the participant's latest arrest. Independent variables selected a priori for their association with prescription opiate misuse were age, race, gender, education, employment, and other drug use.

Statistical analysis

Data are presented for the entire cohort and among the four yearly cohorts to examine changes in drug use over time. In order to examine these changes, the prevalence rates of opiate misuse in each cohort (2001 to 2004) were compared using Poisson regression. Rates for

Table 2. Correlates of prescription opiate misuse among 800 rural probationers					
	Prescription opiate misuse (n = 290)		**No prescription opiate misuse (n = 510)**		**p value**
Age, median (IQR) (years)	31.8 (25.3 to 40.2)		32.5 (25.1 to 40.8)		0.858
Education, median (IQR) (years)	11 (9 to 12)		11 (9 to 12)		0.647
	n	**percent**	**n**	**percent**	
Year					
2001	32	26.7	88	73.3	< 0.001
2002	40	25.2	119	74.8	
2003	106	39.7	161	60.3	
2004	112	44.1	142	55.9	
Male	187	64.5	345	67.6	0.392
Caucasian	281	96.9	480	94.1	0.213
Married	76	26.3	182	35.8	0.001
Recent drug use[1]					
Benzodiazepines	202	69.7	82	16.1	< 0.001
Cocaine	138	47.6	84	16.5	< 0.001
Heroin	11	3.8	3	0.6	0.001
Marijuana	217	74.8	210	41.2	< 0.001

[1] In the three months prior to most current arrest; IQR = interquartile ratio.

prescription opiate misuse were calculated by dividing the total number of participants who used prescription opiates by the total number of participants for a given year. Rates for 2002 through 2004 were then compared to the rate for 2001 (referent group). Unadjusted rate ratios and corresponding 95 percent confidence intervals (CI) were calculated using univariate Poisson regression in STATA, version 8.0 (College Station, TX). Demographic and other drug use characteristics were examined by year using contingency table analyses, t-tests, and the Wilcoxon rank-sum test, where appropriate, to determine whether increases in opiate misuse over time could be attributed to changes in the demographic makeup of the cohorts. Correlates of prescription opiate misuse were also examined using contingency table analyses, t-tests, and the Wilcoxon rank-sum test where appropriate. Finally, three multivariable Poisson regression models (2002 versus 2001, 2003 versus 2001, and 2004 versus 2001) were constructed in which rate ratios were adjusted for significant demographic and drug use characteristics, as well as for gender, age, and race. Aside from age, race, and gender, other demographic and drug use characteristics were only retained in the model if they were statistically significant ($p < 0.05$). The goodness of fit for each multivariable model was estimated using deviance statistics.[14]

Table 3. Independent correlates of prescription opiate misuse by year among rural probationers						
	2002 vs. 2001		2003 vs. 2001		2004 vs. 2001	
	Adjusted rate ratio	95 percent CI	Adjusted rate ratio	95 percent CI	Adjusted rate ratio	95 percent CI
Year	1.09	0.68 to 1.76	1.46	0.98 to 2.17	1.51	1.01 to 2.25*
Gender	0.97	0.59 to 1.60	0.98	0.68 to 1.42	1.22	0.87 to 1.71
Median age	0.81	0.51 to 1.30	0.85	0.60 to 1.19	0.95	0.68 to 1.33
Caucasian	2.56	0.62 to 10.57	1.30	0.61 to 2.80	3.02	0.74 to 12.34
Recent cocaine use[1]	3.84	2.39 to 6.17**				

[1] In the three months prior to most current arrest; * $p < 0.05$ compared to 2001; ** $p < 0.001$ compared to 2001.

RESULTS

The majority of participating probationers were male (66.5 percent) and Caucasian (95.1 percent), and the median age was 32.3 years (interquartile range: 25.2 to 40.5). As seen in Table 1, significantly fewer minority probationers participated in the latter years of the study. The proportion of female probationers was also greater in 2004 compared with 2001.

Examination of prescription opiate misuse in the three months prior to the baseline interview revealed that the proportion of probationers misusing prescription opiates rose significantly over time. In 2001 and 2002, approximately one-fourth of the participants reported prescription opiate misuse. By 2004, the proportion of probationers indicating recent opiate misuse was 44.1 percent ($p < 0.001$). Looking at individual years, compared with 2001, rate ratios (RR) for prescription opiate misuse were significantly greater in 2003 (unadjusted [U] RR: 1.49; 95 percent CI: 1.00 to 2.21) and 2004 (URR: 1.65; 95 percent CI: 1.11 to 2.45).

Table 2 shows the differences in sociodemographic and drug use characteristics in prescription opiate misusers versus nonusers. Examination of these factors reveals that in addition to there being a greater proportion of prescription opiate users in 2003 and 2004, prescription opiate misusers were more likely to be married ($p = 0.001$). Also, probationers who reported using prescription opiates were significantly more likely to report having used benzodiazepines, cocaine, and marijuana in the three months prior to their latest arrest. While a greater proportion of respondents reported using heroin, it should be noted that the overall prevalence of heroin use was quite small (3.8 percent among prescription opiate users and 0.6 percent among those not using prescription opiates).

As seen in Table 3, the independent correlates of prescription opiate use differed in 2002, 2003, and 2004 when compared with 2001. In the earlier cohort (2002), recent cocaine use was significantly associated with prescription opiate use after adjustment for year, gender, median age, and race. In 2003, when covariates were added to the multivariable model, year was no longer significant at the $p < 0.05$ level. However, those probationers interviewed in 2004 were significantly more likely to report prescription opiate use, even after adjustment for salient demographic characteristics (adjusted odds ratio: 1.51; 95 percent CI: 1.01 to 2.25). Deviance statistics indicated a good fit ($p > 0.05$) for each of the multivariable models.

DISCUSSION

In this analysis of prescription drug misuse among felony probationers over time, the prevalence of opiate misuse rose considerably as each succeeding cohort entered the study. However, no clear pattern emerged that could explain these increases. Although there were changes in the demographic makeup of the sample (namely more females and Caucasians in the latter years of the study), these changes were not associated with prescription opiate misuse in the multivariable models. While the prevalence of prescription opiate misuse has increased steadily in the general population over the last 20 years,[15] to our knowledge this is the first community-based study examining changes in misuse over time.

Further, national data do not show the rapid increase that was demonstrated in the current analysis.

What the data did show was that those who misused prescription opiates were more drug involved, suggesting that diverted prescription opiates and benzodiazepines are readily available "on the street" in rural and Appalachian Kentucky counties. Also, as the prevalence of prescription opiate use increased over time, the prevalence of other drug use, including of cocaine and marijuana, remained the same or even decreased, while prescription benzodiazepine use, like opiate use, increased. Even after adjusting for salient demographic and drug use characteristics, the rate of prescription opiate misuse was significantly greater in 2004 when compared with 2001, indicating a shift in drug use patterns among rural probationers from illicit to prescription drugs.

Increased availability of prescription opiates may have contributed to the escalating prevalence of misuse over time. Havens and colleagues[16] reported that rates of OxyContin prescription claims in the Medicaid claims for distressed Appalachian Kentucky significantly increased between 1998 and 2002, which suggests the potential for diversion. Further, National Drug Intelligence Center reports indicate that heroin, which is highly prevalent in urban settings, is not readily available in rural settings like Appalachia.[17] The current study supports these findings, as less than 5 percent of respondents reported recent heroin use.

There were several limitations for the current analysis and overall study. A limitation of the current analysis was that there was no measure of chronic pain. Perhaps the increasing rates of prescription opiate misuse could be associated with an increase in the prevalence of chronic pain in this cohort of rural probationers. However, while there was no direct measure of pain, data on the disability status of the respondents were available, and as the prevalence of prescription opiate use rose, the number of subjects reporting being on disability decreased. Another limitation of both the current analysis and overall study is that the findings are not generalizable to all rural people; although this was a community-based study, the study sample is only representative of one segment of the criminal justice system. Finally, all findings were based on self-reported data. However, it has been shown that self-reported drug use is both a reliable and valid measure of actual drug use.[18,19]

Despite these limitations, our findings provide further support that Appalachian Kentucky may be an epicenter of a prescription opiate epidemic. The high prevalence of prescription opiate misuse also has implications for treatment; simply put, there is a lack of viable substance abuse treatment options in most rural areas, including Appalachia. Finally, it appears that additional population-based studies of prescription opiate misuse in rural areas are warranted.

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