

BRIEF COMMUNICATION

Observations on the effects of buprenorphine and methadone on illicit drug use

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ABSTRACT

Objective: To determine if the agonistic effects of buprenorphine and methadone affect drug use.

Method: Quantitative examination of urine drug concentrations of patients treated with buprenorphine and methadone.

Results: Patients on buprenorphine had less opioid and methamphetamine drug use than those on methadone.

Conclusion: Patients on buprenorphine therapy appear to use less illicit drugs.

INTRODUCTION

Both buprenorphine and methadone are used to treat patients with substance abuse disorder.¹ Buprenorphine is designated as a very high affinity partial agonist that affects the μ opioid receptor. Methadone is an agonist for the μ receptor. It seems logical that patients being treated with these drugs might have to use more of their illicit drugs if they wish to continue with their substance abuse.

We perform urine drug tests on a population of patients being treated for substance abuse disorder.² Our tests quantitate the amount of prescribed and nonprescribed drugs found in these tests. Using these criteria, we tested the hypothesis that the agonistic effects of buprenorphine or methadone affected the amount of opiate or other drug use.

METHODS

We examined the results of approximately 2 million urine drug tests.² The analyses were performed using the method of Krock et al.³ The data collection was performed as described by Pesce.⁴ We used the median observed urine drug concentration of each population as the indicator of the amount of nonprescribed drug used.

RESULTS

Table 1 crudely categorizes these effects on various illicit (nonprescribed) drugs. The agonistic effect clearly works for methadone on heroin—6-Monoacetylmorphine (6-MAM)—and fentanyl, as subjects on this drug had higher concentrations of 6-MAM and fentanyl compared to those not on methadone or buprenorphine. Patients on buprenorphine had lower median concentrations of 6-MAM or fentanyl versus those not on drug treatment. This may be due to its role as a partial agonist or the method of treatment for this group of patients. We also observed that both buprenorphine and methadone affected cocaine use, as measured by benzoylecgonine. However, patients on methadone apparently used more of this drug. There was a great difference in methamphetamine use. Patients on methadone had much higher concentrations of this drug. Both buprenorphine and methadone have some effect on tetrahydrocannabinolic acid use.

We also examined the incidence of polysubstance abuse in these populations over time by examining the coincidence of fentanyl. Figure 1 shows the percent of drug tests positive for both buprenorphine and fentanyl from 2016 to 2023. During this period, the observed percentage increased from about 2-3 percent to about 5.6 percent, indicating a slight

Table 1. Number of observations and median observed urine drug concentrations of subjects also taking buprenorphine or methadone compared to those not on mu agonists

Drug	Median (ng/mL)	Number
<i>Fentanyl</i>	56	43,966
+ Buprenorphine	15	21,216
+ Methadone	122	24,165
<i>6-MAM</i>	276	6,869
+ Buprenorphine	162	2,537
+ Methadone	427	8,494
<i>Benzoylcegonine</i>	166	44,213
+ Buprenorphine	269	29,294
+ Methadone	597	14,204
<i>Methamphetamine</i>	3,815	61,790
+ Buprenorphine	3,929	37,875
+ Methadone	13,444	24,071
<i>THCA</i>	268	188,419
+ Buprenorphine	358	96,558
+ Methadone	369	25,858

change in coincident use. However, the incidence of co-use in patients on methadone therapy increased from about 4 percent in 2016 to about 28 percent in 2023 (Table 2).

DISCUSSION

We tested the hypothesis that patients on buprenorphine and methadone would have their μ receptor affected, and this should be reflected in their consumption of drug, as indicated by their median urine drug concentration. This hypothesis held for methadone but not buprenorphine. We noted that both the methadone and buprenorphine groups used more cocaine and marijuana. We noted a huge difference in methamphetamine use in the methadone treatment group, which is unexplained.

In addition, we observed about a two-fold increase in fentanyl use in buprenorphine-treated patients, while an increase from about 5 percent to about 30 percent was observed in methadone-treated patients. All these data seem to indicate that buprenorphine is a more effective treatment for substance abuse users.

Other studies have also used urine drug concentrations as an index of drug use.⁵⁻⁸ Although this comparison may be limited for an individual, it may be appropriate for a substance abuse population.

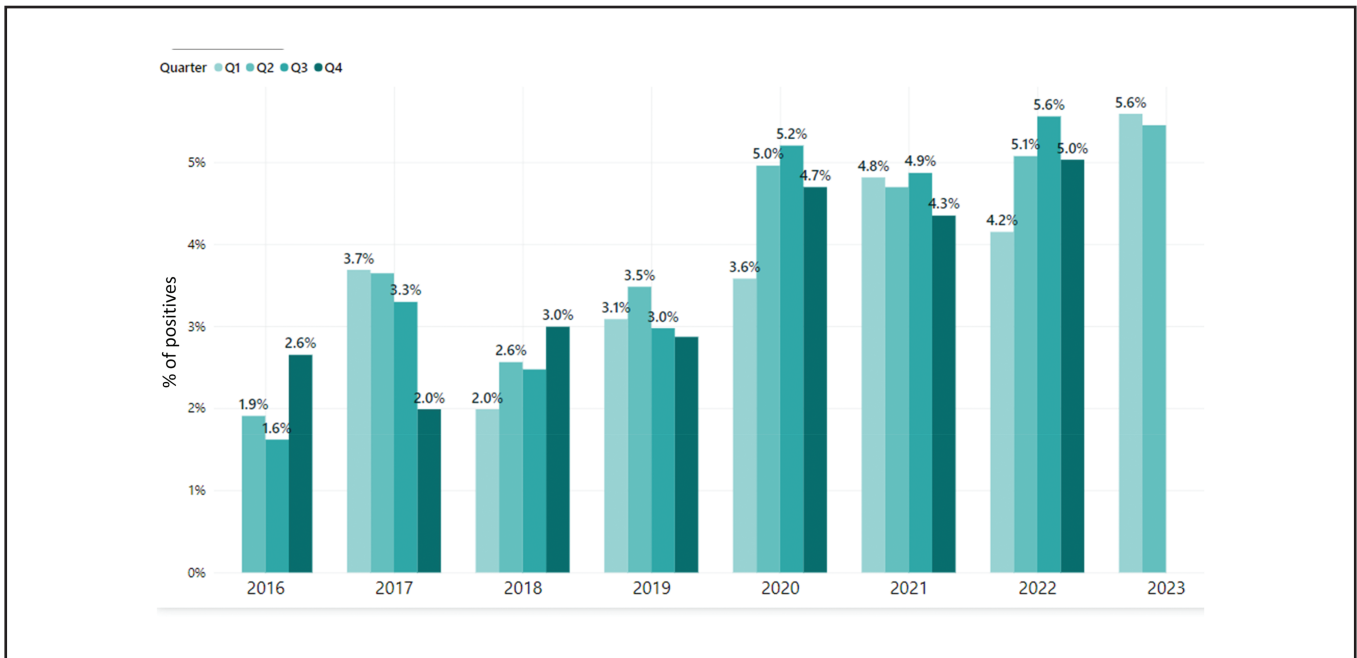


Figure 1. Incidence of buprenorphine- and fentanyl-positive drug screens.

Table 2. Yearly change in fentanyl use in patients treated with methadone

Year	Percent of methadone drug tests also positive for fentanyl
2016	4.2
2017	6.4
2018	6.6
2019	8.0
2020	12.9
2021	20.6
2022	26.4
2023	29.2
2024	27.2

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