

Prescription opioid dependence and treatment with methadone in pregnancy

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ABSTRACT

Prescription opioids are used medically to treat pain, but their diversion and abuse continues to escalate in the United States.¹ Abuse of OxyContin (Purdue Pharma LP, Stamford, CT), a timed-release form of oxycodone, is a major focus of public health and law enforcement agencies.² The rise in opioid abuse may lead to an increase in opioid dependence in pregnancy, which was a focus of this study. Our retrospective chart review examined the demographics and patterns of opioid addiction of pregnant women admitted to an inpatient psychiatric unit in an academic medical center in central Kentucky. Charts of 94 women admitted from January 2001 to May 2004 were reviewed. Information obtained included demographics and details of their opioid use, including the specific opioid(s) used, route of administration, and duration of use. Treatment information included length of hospital stay, stabilizing dose of methadone, comorbid drug use, and concomitant Axis I diagnoses. Most women were in their mid-twenties and in the second trimester of pregnancy when they sought treatment. Benzodiazepines were the most common comorbid drugs of abuse and the most frequent medical complication of their drug use was hepatitis C, newly diagnosed in 11 patients. This study demonstrates the need for further research in prescription opioid dependence in pregnancy, methadone maintenance therapy, the safety of detoxification, and neonatal outcomes.

Key words: opioids, oxycodone, methadone maintenance therapy, addiction, pregnancy

INTRODUCTION

Prescription opioids are used to relieve chronic pain associated with cancer, bursitis, dislocation, fractures, neuralgia, arthritis, low back pain, and other injuries.³ OxyContin, distributed beginning in 1995 by Purdue Pharma, LP (Stamford, CT), is a timed-release form of oxycodone that is manufactured as a long-acting analgesic for moderate to severe pain.¹ Oxycodone and

hydrocodone are prescribed in numerous formulations, with combination prescription medications with acetaminophen and aspirin including Lortab (UCB Pharma, Inc., Smyrna, GA), Percocet (Endo Pharmaceuticals, Chadds Ford, PA), and Percodan (Endo Pharmaceuticals) as some of the most widely prescribed and abused forms. The opioid agonist effects of these medications relieve pain, but also have the potential to produce feelings of euphoria, as with heroin. Although these prescription narcotics are typically swallowed, substance abusers may crush the pills and take them orally, snort them, or dilute the crushed pill in water and inject the solution intravenously.¹

Abuse of opioids has occurred for many years, but it gained more attention in the late 1990s as the abuse of prescription opioid pain relievers steadily increased in the United States.³ According to the Drug Abuse Warning Network, opioid pain relievers accounted for more than 119,000 emergency department visits in 2002, with oxycodone and hydrocodone named in 40 percent of those visits. Opioid pain relievers were mentioned as frequently as heroin or marijuana in emergency department visits related to drug abuse.²

Several eastern states—Maine, West Virginia, Virginia, Kentucky, Pennsylvania, Ohio, and Florida—are disproportionately affected by opioid abuse, with their use now spreading to the western states of Arizona, California, and Alaska.¹ In eastern Kentucky, the diversion and abuse of opioid pain relievers is a major focus of public health concern. Eastern Kentucky counties lead the nation in grams of narcotic pain medications distributed on a per capita basis. According to the Drug Enforcement Agency, in 2003, 19,366 dosage units of diverted pharmaceutical drugs were seized by local Kentucky agencies.⁴ In response to this rapid increase, a new Office of Drug Policy was formed in August 2004 that is responsible for coordinating the state's drug-fighting efforts.⁵

Drug abuse in pregnancy is a nationwide problem, with an estimated 221,000 women using illegal drugs during their pregnancy of the more than 4 million women

that give birth each year.⁶ Of these births, 9,000 fetuses are exposed to narcotics—heroin or methadone—which is two to three neonates per 1,000 births in the United States.⁷ Kentucky state officials, in 2000, mandated pregnant women experiencing opioid withdrawal symptoms be placed on methadone maintenance therapy (MMT). In Kentucky, 334 pregnant women visited a treatment facility for opioid abuse from 1999 to 2003. Statewide, there was a steep rise from 16 women seeking treatment in 1999 to a more than 700 percent increase in 2003 to 115 women. This increase has stimulated the medical community to readdress the issues of appropriate treatment—MMT versus detoxification—and comprehensive outpatient follow-up for these women.

The goal of our study was to develop a current profile of prescription opioid addiction and dependence in pregnancy. The recommended treatment of choice in opioid dependence in pregnancy since the 1970s has been MMT, to prevent fluctuating levels of opioids that cause fetal withdrawal symptoms and consequently decrease the risk for spontaneous abortion of the fetus or premature delivery.^{8,9} Few studies have focused on prescription opioid abuse and the multiple drugs that entails, however. The majority of research has focused on heroin addiction in pregnancy leading to dosage recommendations for MMT in this population.

We collected information on the demographics of opioid abusers, effective doses of MMT, and medical and obstetrical complications related to opioid abuse, which also may differ from previous research in heroin-addicted populations. We hypothesized that inpatient treatment for opioid dependence during pregnancy would be increased in eastern Kentucky from the years 2000 to 2004 with the overall increase in prescription opioid abuse and the mandate in Kentucky that prescription opioid-dependent pregnant women be placed on MMT. Other focuses included investigating the average dose of methadone used for MMT, which we thought would differ from heroin-addicted pregnant women. Examining the number of patients with chronic pain syndromes was also important to determine if there would be higher rates in our study group than heroin-addicted pregnant women because prescription opioids are used to relieve pain.

METHODS

The authors performed a retrospective chart review from an inpatient psychiatric unit at the University of Kentucky Chandler Medical Center to determine the demographics and medical treatment of prescription opioid-dependent pregnant women. The hospital is a regional facility that serves the eastern and central portions of Kentucky and averages 1,800 deliveries per year. Information gathered during the paper chart review was

performed by one reviewer, therefore relying on a single interpretation of the medical record. Uniform psychiatric history and physical forms were used during the years of this study, thus making the data consistent between medical records because standard questions on the form included details of drug use including types of drugs used, duration of use, and comorbid drug use per patients' reports. Interviewers typically recorded patients' drugs of choice and route of administration as well, which is discussed later in the paper. Although detailed information was gathered from all 94 medical records, chart reviews were limited by their retrospective nature and the information the interviewer gathered. The data collected for this study were considered good, owing to the specific substance abuse data gathered through a structured admission interview.

A computer-generated list of admissions of women with the primary or secondary diagnostic code for drug dependence, antepartum (ICD-9 code 648.33) admitted from January 2001 to May 2004 was compiled, which totaled 130 admissions. Ninety-four of these pregnant women had an Axis I diagnosis of Opioid Dependence and were included in the study. Some patients had multiple admissions during a single pregnancy, but only the first admission with the initiation of MMT was included. During the 41 months of the study, one woman had two pregnancies, but only the first pregnancy was included in the study.

Pregnant women with opioid dependence in this study were admitted to the inpatient psychiatric unit unless they had complications and needed inpatient obstetrical monitoring. When these patients were admitted to the psychiatric unit, an initial evaluation was performed by an obstetrician. Women were started on scheduled doses of methadone and had withdrawal checks, which combined subjective and objective signs and symptoms of opioid withdrawal, performed every four hours. Depending on their withdrawal scores, they may have received supplemental doses of methadone. During their hospital course, patients who complained of pain were also monitored using a pain rating scale of 1 to 10. The women were hospitalized until their methadone dose was consolidated into a once-a-day dosing schedule.

Data gathered from the medical records included demographic information regarding age, race, geographic area, marital status, gestational age of the fetus, and number of previous children. Information specific to the patient's opioid use included her preferred opioid, route of administration, duration of use, and comorbid drug use. Treatment data were obtained including stabilizing dose of methadone, days to stabilization, complications of initiating MMT or detoxification, length of hospital stay, and concomitant Axis I diagnoses. These data were then analyzed using descriptive statistics and computer software (SPSS 12.0, SPSS Inc., Chicago, IL, and GraphPad

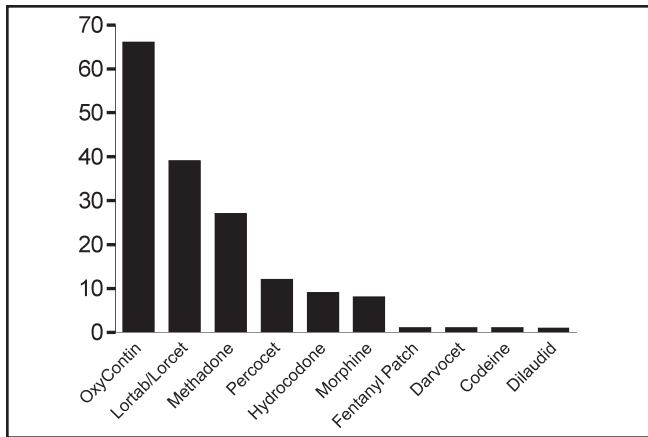


Figure 1. Number of times specific opioids were mentioned in patient interviews as having been used during the pregnancy.

Prism 4, GraphPad Software, Inc., San Diego, CA) to calculate standard deviation and construct histograms to reveal trends of prescription opioid-dependent pregnant women including their demographics, opioid use, rates of admission, and substance abuse and medical treatments.

RESULTS

As hypothesized, admission numbers of prescription opioid-dependent pregnant women to the inpatient psychiatric ward at the University of Kentucky increased from 2001 to 2003; only partial data were collected for 2004. The initial admissions for treatment for pregnant women with opioid dependence increased from 11 admissions in 2001 to 25 admissions in 2002, and 46 admissions in 2003. Thirteen patients were admitted from January to May of 2004. The average age of these 94 prescription opioid-dependent pregnant women was 24.5 years, with a range of 18 to 43 years. Ninety-three (98.9 percent) of the women were Caucasian, with only one African American (1.1 percent). Eighty-two (87.2 percent) women were from a rural area, defined as any city or town outside of Lexington, considered the only urban center in eastern or central Kentucky. Only 12 (12.8 percent) of the patients were from Lexington.

The women's marital status on admission was recorded and did not include prior marriages or pending divorces. Thirty-five (37.2 percent) women were single at the time of their admission. The number of women married or divorced was similar, with 26 (27.7 percent) women married and 22 (23.4 percent) divorced. Nine (9.6 percent) of the patients had legal separations and two (2.1 percent) of them were widowed. The average number of children the women had before the pregnancy on admission was 1.3. For 19 (20.2 percent) women, it was their first pregnancy. The study did not include whether patients had maintained legal custody of their previous

children. When examined in the context of marital status, married women averaged 1.38 children, single women one child, and divorced women 1.54 children before their current pregnancy.

Obstetrical information was also gathered including gestational age of the fetus, which was dated by physical examination and ultrasonography from an obstetrician at an outside hospital or clinic or by the inpatient obstetrical team at the University of Kentucky. The average gestational age for these pregnancies was 21.2 weeks. Thirty-one (33 percent) of the 94 women presented for admission in their first trimester, with the earliest presentation at five weeks and five days. Thirty-nine (41.5 percent) women of the patients sought treatment in their second trimester, while 22 (23.4 percent) women were not treated until their third trimester. Two (2.1 percent) women's pregnancies were not dated during admission owing to short hospitalization.

Opioid Dependence was part of an Axis I diagnosis in all 94 women, and they reported use of a wide variety of prescription opioids (Figure 1). Data gathered during the chart review included all of the opioids mentioned by the patients during the admission interview whether or not it was their drug of choice. OxyContin was mentioned by patients most frequently at 66 times, and Lortab or Lorcet followed at 39 mentions. Other frequently mentioned opioids included methadone, Percocet, hydrocodone, and morphine, in that order.

Use of a single prescription narcotic was reported by 47 patients, whereas 47 reported multiple opioids of abuse. OxyContin was reported in 28 of the single-prescription opioid patients and by 40 of the patients reporting multiple opioid use. The average dose of OxyContin was 152.4 mg in women who reported their daily amount, with a standard deviation of 147.8 mg and a mean of 154.1 mg ($n = 68$). The minimum dose reported by women on admission was 25 mg and the maximum was 1,000 mg, thus the range was 975 mg. On average, the patients had been abusing prescription narcotics for 2.9 years. Their preferred route of administration of OxyContin was snorting, which was seen in 24 (35.3 percent, $n = 68$) women. However, oral administration—swallowing or chewing—and intravenous use were very similar in reported use, with 23 (33.8 percent) patients swallowing or chewing the pills and 19 (27.9 percent) patients using it intravenously. Two (3 percent) patients reported multiple routes of administration without a recorded preference.

Comorbid abuse of prescription and illicit drugs was common in this study group. Marijuana was the most common illicit drug reported, and benzodiazepines were the most commonly reported prescription drugs abused (Figure 2). Alprazolam (Xanax, Pfizer, Inc., New York, NY) was the most frequently reported benzodiazepine with 42 (44.7 percent) patient mentions. Cocaine was

also mentioned by 30 (31.9 percent) patients on admission. Other comorbid drugs included amphetamines, LSD, and heroin. Tobacco use by patients was also gathered during the study, with 71 (75.5 percent) of the 94 patients reporting regular cigarette smoking during their pregnancy. Seven (7.4 percent) women reported alcohol use during their pregnancy, with one drinking daily, one drinking every other day, and the remaining five reporting binge drinking. Negative blood alcohol levels were reported in 32 women, and no positive levels were recorded.

It is routine for patients being admitted to this inpatient psychiatric unit to have a urine drug screen, which screens for common drugs of abuse and prescription medications. The laboratory at the University of Kentucky uses a combination of immunoassay, thin-layer chromatography, gas chromatography, and mass spectroscopy to detect common prescription medications and drugs of abuse in urine samples. Seventy-eight (83 percent) of the 94 patients had urine drug screens performed and documented. Of the 16 (17 percent) who did not have a recorded urine drug screen, eight of those had one performed at an outside hospital. The drugs of abuse other than opioids most commonly seen on the urine drug screens were benzodiazepines and marijuana (Table 1). Although benzodiazepines were detected in 40 (51.3 percent, n = 78) urine samples, only three women had significant benzodiazepine withdrawal symptoms and required detoxification with clonazepam or diazepam.

Forty-six (48.9 percent) of the women had previous inpatient or outpatient treatment for substance abuse before admission. Five (5.3 percent) of the patients had previously been on MMT, and eight (8.5 percent) who presented for admission had already started on MMT. On average, it took 4.92 days to stabilize patients on methadone and the length of hospitalization was 7.4 days, with a median of 6.86 days. Stabilization was defined as not requiring supplemental doses of methadone during a 24-hour period, which were given for specific subjective and objective withdrawal scores. It did not require a lack of drug craving. The average discharge dose of methadone was 42.5 mg once daily to negate withdrawal symptoms. Only one patient was discharged on a twice-a-day dosing schedule.

All patients included in the study had a diagnosis of Opioid Dependence made by the clinical judgment of the inpatient psychiatrists and supported by *Diagnostic and Statistical Manual-IV* criteria. While the patients were hospitalized, they were evaluated for comorbid Axis I diagnoses. Polysubstance Abuse or Dependence was in the diagnosis of 22 women. The most frequently diagnosed mood disorder was depression—Major Depressive Disorder or Depressive Disorder, Not Otherwise Specified. Anxiety disorders requiring medication also

Table 1. Number of times specific drugs were detected on urine drug screen

Drug	Times detected
Benzodiazepines	40
Marijuana	12
Cocaine	5
Amphetamines	4
Carisoprodol (Soma)	3
Barbiturates	3

occurred, with three patients diagnosed with Anxiety Disorder, Not Otherwise Specified and another three patients with Panic Disorder (Table 2).

Several patients did report using prescription opioids for chronic pain syndromes. Three women had a diagnosis of lower back pain, one owing to severe scoliosis, another to degenerative discs, and one resulting from a motor vehicle collision. The only African-American woman in the study had severe pain owing to sickle cell disease. One woman had been on narcotics for three months for kidney stones, and another had persistent pain from a talus fracture sustained in a motor vehicle collision. Thus, six (6.4 percent) women of the 94 included in the study had a formal chronic pain diagnosis.

Several other medical conditions were diagnosed and treated while the patients were hospitalized. Hepatitis C was newly diagnosed in 11 (11.7 percent) patients, with nine of those confirmed by ribonucleic acid polymerase-chain reaction before discharge from the psychiatric unit. Other diagnoses included left lower lobe pneumonia, multiple abscesses on one patient's upper extremity, and nephrolithiasis. The most serious complication during hospitalization of these 94 women occurred when one patient was given supplemental doses of methadone for subjective withdrawal symptoms only and the woman became apneic and cyanotic. The patient was intubated and placed on a naltrexone (Narcan, Endo Pharmaceuticals) intravenous drip for four hours and then readmitted to the psychiatric ward.

Obstetrical issues included three reports of decreased fetal movements, four nonreactive nonstress tests, fetal heart decelerations in two patients both over 33 weeks of gestational age, premature contractions in two patients, and marginal placental abruption in a patient abusing cocaine and opioids. Multiple congenital anomalies were found in a fetus during admission on ultrasonography in one patient. No miscarriages occurred while the patients were hospitalized, including those placed on MMT, and in the three women who underwent

Table 2. Number of opioid-dependent pregnant women receiving a comorbid Axis I diagnosis

Comorbid Axis I diagnosis	Number of patients
Polysubstance abuse/dependence	22
Benzodiazepine dependence	8
Depressive disorder, NOS	6
Anxiety disorder, NOS	3
Panic disorder	2
Cannabis dependence	2
Substance induced mood disorder	1
Alcohol dependence	1
Bipolar affective disorder, NOS	1
Malingering	1
NOS, not otherwise specified.	

opioid detoxification in their second trimester.

Thirteen (13.8 percent) patients required a second admission during their pregnancy. These admissions were not included in the data set. Reasons for readmission included continued polysubstance abuse or patients' noncompliance with outpatient treatment requiring re-dosing of methadone in an inpatient setting.

DISCUSSION

The average prescription opioid-dependent pregnant woman admitted to the inpatient psychiatric unit in our study was a 24-year-old Caucasian woman from a rural town in eastern Kentucky in her second trimester using OxyContin. Demographically, our study is reflective of recent national trends with regard to age, race, and geographic location according to the 2003 National Survey on Drug Use and Health. Young adults aged 18 to 25 years are more likely to abuse prescription narcotics than adolescents or adults older than 26 years.¹⁰ Although our data are consistent with national trends, the average age of our patients may not be entirely representative of opioid abuse in pregnancy in this region, as the psychiatric unit at the University of Kentucky admits only those patients 18 years old or above. Thus, the data may be skewed to an older average age, as teenage pregnancies complicated by opioid abuse are not included.

The predominance of women living in rural settings using prescription opioids is likely correlated with the prevalence of opioid diversion in rural areas. The Appalachian area (i.e., Kentucky, Tennessee, and West Virginia) is designated as a high drug trafficking area by the DEA for prescription narcotics.¹¹ The scarcity of people,

fewer law enforcement officers, and the lower socioeconomic status of rural areas allow opioid diversion to flourish. Opioid diversion provides a significant financial resource for this population, with OxyContin being sold for \$1.00 per milligram and few opportunities for gainful employment in such remote areas.

OxyContin was the most frequently mentioned prescription opioid used in this study, and women were almost evenly distributed in their preferred route of administration. OxyContin is a form of oxycodone that can be used via snorting, ingesting, or injecting, which allows changes in administration to produce a long-lasting euphoria with increasing tolerance. Although eastern Kentucky is considered a low-injecting area, the use of OxyContin intravenously is becoming more widespread since it first became available in 1995. Intravenous use is likely on the rise because fewer milligrams of OxyContin are needed to produce its euphoric effects when it is injected and thus is less expensive.

Maternal use of opioids is not the only concern for potential effects to the fetus, but also the high comorbidity seen with smoking and alcohol in opioid-dependent pregnant women. Seventy-five percent of the women in the study were smokers. Studies have reported that 70 to 90 percent of substance abusers also are moderate to heavy smokers.⁸ Although high rates of tobacco use are seen in substance users, the fact that the study was conducted in Kentucky is also a mitigating factor. Kentucky is a state with a large production of tobacco and high usage rates. In studies reporting high smoking rates, there is also a high prevalence of comorbid alcohol abuse in substance abusers.⁸ The rates of alcohol use were low in this group, however, with only seven women reporting any alcohol use and two of those with daily or every-other-day patterns. Patients often underreport alcohol use, but none of the blood alcohol levels obtained in 32 of the women had any detectable ethanol in this study. Alcohol serum concentrations have a short half-life, however, thus decreasing the number of patients abusing alcohol detected through this test. Smoking and alcohol present medical concerns for the fetus that can overlap with findings in neonates exposed to opioids. Whereas alcohol can cause a constellation of birth defects defined within fetal alcohol syndrome, alcohol and nicotine can cause intrauterine growth retardation or small for gestational age neonates and confuse causation of these findings with maternal opioid use.

Only 16 women in the study reported no comorbid drug use, but all of these 16 women were smokers. Two women reported no comorbid drug use and no smoking or alcohol use. Marijuana and benzodiazepines were the drugs most frequently abused other than opioids per patient report and urine drug screens performed. Previous studies have shown that 40 percent of patients entering MMT use cocaine as well as heroin.¹² Although

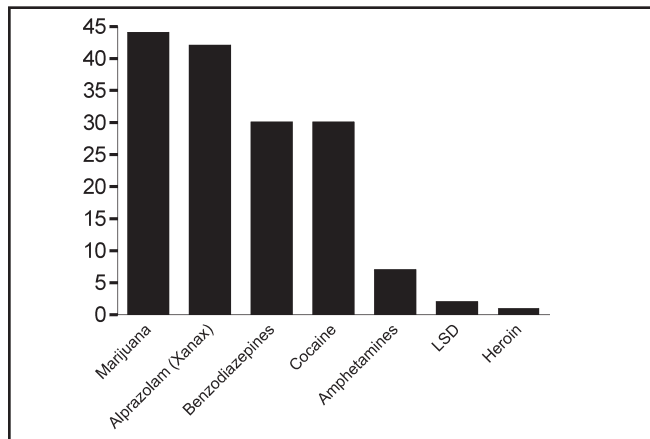


Figure 2. Frequency of comorbid drugs used with opioids in the 94 women in the study.

30 women reported using cocaine, it was only detected in five of the 86 urine drug screens performed. This may owe to the short half-life of cocaine, which is typically seen for only 72 hours in the urine after use. Only 22 (23.4 percent) of the women in this study were given a comorbid diagnosis of Polysubstance Abuse or Dependence; however, there were multiple illicit drugs reported on admission (Figure 1). Again, a difference in half-lives and discrepancies in urine drug screens—cross reactivity with other medications, lack of sensitivity in detecting semi-synthetic opioids, and windows of detection time—may have skewed the data and demonstrated an under reporting and under diagnosis of Polysubstance Abuse.¹³

Medical complications of drug abuse are another concern for maternal and fetal and neonatal outcomes. There were 11 patients with a new diagnosis of hepatitis C while admitted to the inpatient psychiatric ward during the period of this study. Another study had a wider range of 67 to 84 percent of MMT patients infected with hepatitis C virus.¹² With increasing intravenous drug use in prescription opioid users, human immunodeficiency syndrome, hepatitis B, and hepatitis C, as well as other infectious risks, such as endocarditis or sepsis, will continue to escalate and should be rigorously screened for in pregnant women, as they may lead to further obstetrical or fetal complications. Hepatitis C in intravenous drug users has been shown in studies to be as prevalent as 90 percent.¹⁴

The average dose of methadone on discharge from the unit in these women was 42.5 mg. This is a lower dose than is typical for heroin-dependent pregnant women. An equivalent methadone dose for the women in our study would be 75 to 100 mg, with the average dose of OxyContin reported as 152.4 mg. One study shows most heroin-addicted users require 60 to 120 mg per day of methadone to achieve optimal effects.¹² Another study reports heroin-addicted women who received an average methadone dose less than 80 mg had a trend toward a higher incidence of illicit drug abuse before pregnancy,

highest neonatal abstinence score, need for neonatal treatment for withdrawal, and duration of withdrawal compared to women who were on 80 mg or more.^{8,15} This study concluded that maternal methadone doses do not correlate with neonatal withdrawal, and, thus, maternal benefits of effective methadone dosing are not offset by neonatal harm. The goal of the inpatient stabilization period of the women in this study was to minimize withdrawal symptoms, not to prevent recidivism. A maintenance dose of methadone during hospitalization was based on signs and symptoms of withdrawal—tachycardia, hypertension, elevated temperature, vomiting, diarrhea, piloerection, myalgias, and headache. Once withdrawal checks were no longer significant, that dose was consolidated to a once-a-day dose. Drug craving was not considered in the dose of methadone while hospitalized, which could partially account for the low dose of methadone. Also, patients may have over reported their prescription opioid use—the range was 975 mg, with a standard deviation of 147.8 mg—in an effort to obtain methadone and prevent continued withdrawal.

Only three (3.2 percent) of the 94 patients in this study underwent detoxification from opioids with a methadone taper. All of them occurred in the second trimester, which historically is the most widely accepted time, owing to decreased risk of miscarriage in the first trimester and fetal withdrawal and premature delivery in the third trimester.⁸ Only 39 women presented for treatment in their second trimester, however. This low rate of detoxification is reflective of the continued concern about harm to the fetus combined with concern that women will continue to abuse opioids on release from an inpatient facility if they undergo detoxification. Although there were no miscarriages, one woman was admitted to the obstetrical service in preterm labor. She had a history of preterm delivery and was stabilized and transferred to the psychiatric ward for further treatment. Another pregnancy was complicated by multiple congenital fetal anomalies seen on ultrasonography; however, further investigation revealed normal chromosomes in the fetus. The biologic cause of the anomalies was not determined before discharge, but the literature does not support opioid abuse as the cause.

There were 47 comorbid Axis I disorders diagnosed in the 94 women in the study. According to studies, more than 40 percent of patients with addictive disorders also have mental disorders.¹² Often, patients may be attempting to self-medicate with illicit drugs when they do not have the financial means to seek appropriate medical treatment. The majority of the diagnoses in this group of women were related to other substances of abuse, not affective or psychotic disorders. This further reiterates the commonality of polysubstance use in opioid dependency.

Chronic pain and evaluation of pain are issues pertinent to the patients in this study. Only six of the 94 women were diagnosed with a chronic pain syndrome on Axis III. This

may owe to inadequate records or insufficient evaluation of pain in these patients, but pain relief does not appear to be the only reason for abuse of these drugs. Reviewing the preferred methods of use reveals almost equal numbers snorting and injecting opioids as taking them orally. These more potent methods provide a heightened sense of euphoria, which may indicate a need to self-medicate a mood disorder. Only seven women in this study were diagnosed with a primary affective disorder, which is statistically less than the general population. The inpatient physicians may not have diagnosed a mood disorder secondary to the patients' concomitant opioid abuse and short hospitalizations, however. Thus, there are several reasons that may contribute to opioid abuse, but further research needs to be conducted to determine the percentage of women attempting to treat pain syndromes.

CONCLUSION

MMT in pregnancy continues to be a controversial issue for medical professionals who treat the mother and fetus. With the increasing number of prescription opioid-dependent pregnant women seen in our study, however, it will continue to be a clinically relevant medical issue. Our study shows a lower dose of methadone than expected to stabilize women using supratherapeutic doses of prescription opioids. It must be recognized that the goal of methadone in the inpatient setting was to relieve withdrawal symptoms to prevent fetal withdrawal and decrease the risk for fetal demise. Further research needs to be conducted on appropriate doses of methadone for women who are prescription opioid users in an outpatient setting, because the majority of the research involves heroin-addicted women. The question remains whether or not lower doses of methadone in prescription opioid-dependent pregnant women will prevent further abuse during pregnancy. Medical detoxification is another option that is not adequately addressed in this study, but merits further research. Addiction does not resolve with detoxification; thus, supports must be in place for pregnant women to help avoid recidivism.

With only six of the 94 women included in the study receiving a chronic pain diagnosis, it is clear that pain must be evaluated more diligently. Often, women in the study began using narcotics for a short-term pain issue that acted as a gateway to abuse of the drug. Thus, the medical community must be aware of the addictive power of opioids when prescribing them to relieve short-term pain and discuss this with patients, including family histories of addictive disorders. Physicians must also be careful to not be insensitive to the needs of patients with chronic pain and must work to provide comprehensive services to help alleviate pain and allow people to be productive.

Long-term outcomes must continue to be studied in neonates with prescription opioid and methadone exposure to evaluate neurobehavioral outcomes. Comprehensive

programs that target the mother-infant dyad through educational and emotional support from peers and professionals can ameliorate these consequences.⁸ Our study reiterates the need for further studies in maternal and fetal outcomes of pregnancies affected by prescription opioids as the number of pregnant women addicted to these medications seeking treatment increases in eastern Kentucky. More research will lead to evidence-based treatment with the goal to decrease prescription opioid abuse in pregnancy and provide appropriate comprehensive services to improve long-term outcomes.

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