Published in final edited form as:

J Maint Addict. 2006 January 1; 3(1): 61–82. doi:10.1300/J126v03n01_06.

An Exploratory Study of Inhalers and Injectors Who Used Black Tar Heroin

Jane Carlisle Maxwell, PhD[Research Professor] and

Center for Social Work Research, University of Texas at Austin, 1717 West 6th Street, Suite 335, Austin, TX 78703 (jcmaxwell@mail.utexas.edu)

Richard T. Spence, PhD[Research Professor]

Center for Social Work Research, University of Texas at Austin, 1717 West 6th Street, Suite 335, Austin, TX 78703 (rtspace@mail.utexas.edu)

Abstract

Aims—To undertake an exploratory study to examine the characteristics of patients in narcotic treatment programs who started their use of black tar heroin either as inhalers or as injectors and to compare them with those who started as inhalers but shifted to injecting. Other studies in this area have used subjects using other forms of heroin more amenable to inhaling.

Participants, Design, and Measurement—A purposive sample of 199 patients in 6 methadone programs in Texas were interviewed in 2002–2003 using a structured instrument.

Findings—At admission to treatment, those who were heroin inhalers were more likely to be African American, to live with their families, to have income from wages, and to report fewer days of problems on most of the ASI measures. Those who shifted from inhaling to injecting were more likely to be Hispanic and to have had mental health problems that interfered with their lives and to have had less nurturing while growing up. Injectors were older at this treatment admission, had more treatment episodes and more times in jail, and were more likely to have hepatitis C, AIDS, or gonorrhea. There were high levels of physical and mental problems and histories of traumatization as children and adults for almost all the respondents. Males were as likely as females to have been sexually abused as children or as adults.

Conclusions—The high rates of mental and physical problems among all the clients interviewed showed the need for comprehensive services to be delivered within the substance abuse treatment programs. Histories of trauma and sexual abuse should be addressed for both male and female clients.

Keywords

Black tar heroin; shebanging; inhaling; injecting; snorting

INTRODUCTION

This is a study which examines the characteristics of patients in narcotic treatment programs in Texas who used black tar heroin. They began use either as inhalers or as injectors and some remained as inhalers, while others later shifted to injecting. Comparison of characteristics of these clients revealed a number of issues, including childhood history and adult mental and physical problems, as well as living conditions, which have implications that affect treatment outcome.

The initial route of administration of heroin and transition from one route to another are important factors in studying the patterns of use and the multiple problems of heroin users. There are three main routes of administration of heroin: inhaling (or “*snorting*”), smoking (“*chasing the dragon*”), and injecting. A study of 408 heroin users in the U.K. found that more than a third of the sample had changed their predominant route of administration, with the most common transition being from smoking to injecting (Griffiths et al., 1994). A study of current heroin users in the U.K. in 1992-1993 found that while injecting and smoking heroin accounted for virtually all the current heroin users, inhaling was the first route of use for nearly a fifth of the subjects (Strang et al., 1997a, 1997b). A study of 104 heroin inhalers in New York City found that inhaling was the primary route of administration for all subjects at the time of enrollment in the study, but at nine-month follow-up, a third of the subjects were injecting (Des Jarlais et al., 1992).

Studies comparing inhalers, smokers, and injectors have found that injectors are more likely to be male, older, started heroin use earlier, have higher daily doses, possess more extensive histories of use of other drugs, test seropositive for HIV and hepatitis B and C, and have higher levels of dependency (Carpenter et al., 1998; Fuller et al., 2002; Gossop et al., 1994; Griffiths et al., 1992a; Neaigus et al., 2001; Strang et al., 1992). In a previous study by the present authors, which analyzed admission data on 9,732 heroin inhalers and injectors at first entrance to publicly-funded treatment in Texas between 1997 and 2001, injectors were more likely to be younger at first use of heroin, to have entered treatment later, to have lower annual incomes, to have more treatment episodes, and to be Anglo. Inhalers were more likely to be older at first use of heroin, to have entered treatment sooner, to have minor children at home, to have higher annual incomes, to be first admissions to treatment, and to have a secondary drug problem with crack cocaine. They were also more likely to be Hispanic (OR = 1.74) or African American (OR = 12.32) (Maxwell et al., 2004).

Most studies which have investigated routes of administration of heroin have been done in locales where high quality powder heroin was available, and therefore, inhaling and smoking were not only common, but shifting back from injecting to inhaling or smoking was possible. Strang et al. (1997b) described the types of heroin seen in the U.K., with Southwest Asian powder heroin, which had a street purity in the mid-1990s between 30% and 45%, predominating. In New York City, inhaling increased when South American powder heroin, with a purity of over 60%, became available (Frank, 2002).

In the U.S., the route of administration of heroin is influenced by the type of heroin available. The Drug Enforcement Administration’s Domestic Monitor Program reported that east of the Mississippi River, 92% of heroin samples in 2002 were South American, which is a powdered heroin with an average street-level purity of 46%. West of the Mississippi, 98% of the samples in 2002 were Mexican heroin (black tar and, to a lesser extent, brown powder), with an average purity of 27% (DEA, 2003).

Mexican black tar may be sticky like roofing tar or hard like coal. Mexican brown powder may be either a powdered heroin produced in Mexico, or it may be black tar that has been turned into a brown powder by local dealers or users by adding a diluent. The most common route of administration of black tar is injection. Because of its oily, gummy consistency, special steps are required to convert the heroin into a powder that can be inhaled. Diluents (“*cuts*”) can include dormin, mannite (mannitol), lactose, benedryl, Nytol, baby laxative, vitamin B, and coffee creamer. Tar heroin can be frozen, the “cut” added, and then pulverized or ground into a powder in a coffee grinder or with mortar and pestle. It can also be dried out on a plate over the stove or under a heat lamp prior to pulverizing. Because brown powder is diluted, respondents in this study reported that it is preferred by novices and users who fear overdoses.

Given the lower purity and the texture of brown powder heroin, inhaling heroin is less common in the western U.S. A study of heroin users in San Antonio in the 1970s found that only one out of the 248 subjects had started using heroin by inhaling; all others were injectors (Maddux & Desmond, 1981). In 1986, injecting was the most popular way of using black tar heroin in the western U.S., according to a report to the National Institute on Drug Abuse's Community Epidemiology Work Group (1987), and in our study of Texas admission data from 1997-2001, 93% of the heroin admissions were injectors and 7% were inhalers; smoking heroin was rare. In comparison, in a study of routes of heroin administration at entrance to treatment in the U.K., 61% were injectors, 37% were smokers, and 1% were inhalers (Gossop et al., 2004).

Users who do not have the time or equipment to turn tar into powder or do not have a sharp needle to inject heroin can mix the tar with water over heat and squirt the liquid into their nose with a syringe barrel (with or without the needle) or with an eyedrop bottle. They may also pour it into their nose with a teaspoon or medicine dropper or inhale the liquid with a straw. This is known variously as "*shebang*," "*waterloo*," "*agua de chango*," or "*monkey water*."

Inhalation of Mexican heroin is a practice that is not well-understood. Differences between inhalers and injectors and changing routes of administration, as well as patterns of use of this type of heroin have not been studied in this population. This exploratory study sought to learn more about individuals who used Mexican heroin, the factors and characteristics which appeared to distinguish those who remain as inhalers as compared to those who shift to injecting, as well as to provide insight into the histories and multiple problems of the patients in this study.

METHODS

The first phase of this project was an analysis of data collected by the Texas Commission on Alcohol and Drug Abuse (TCADA) on clients who had a primary problem with heroin at first admission to publicly-funded treatment. Based on the analysis of the limited range of data collected in the TCADA data system on clients in public programs, the second phase consisted of in-depth interviews with a purposive sample of 199 clients who were in treatment in public and private narcotic treatment programs in Texas. The length of the interview was approximately one hour. It consisted of semi-structured questions about initiation into heroin use, patterns of substance use, quantities used, and routes of administration. The instrument also included structured questions about Addiction Severity Index problems (McLellan et al., 1980), criminal justice involvement, childhood and family history, and physical and mental health problems, including items from the Center for Epidemiological Studies Depression Scale (Breslau, 1985). The "depression" score ranges from seven to 28. Except for the semi-structured questions about heroin use, the remainder of the instrument had previously been used in surveys of adult prisoners in the Texas criminal justice system (Kerber, 2000, 2001a, 2001b; Kerber & Harris, 2001; Kerber et al., 2001). Thus, unlike many other studies, this project was able to explore a range of problems experienced by inhaling and injecting heroin users.

Interviews were conducted in six large well-established narcotic treatment programs in five metropolitan areas in Texas (Austin, Dallas, Fort Worth, Houston, and San Antonio) in the fall of 2002 and spring of 2003. Based on an initial analysis of program admission patterns, the study locations were chosen based on their track record of admitting clients with a history of heroin inhalation and having a sufficiently large flow of new admissions to obtain a sample of inhalers efficiently. Because the first phase studied clients in publicly-funded programs, four privately-owned programs were included in this study sample. The clients in

the private programs paid a weekly fee for service. Our earlier study had identified one public program with a high proportion of African Americans who had not transitioned from inhaling to injecting, and this program was included in this purposive sample to gather more knowledge about this particular cohort of clients. Clients in a second public program were then interviewed to gather data about African American clients who were more likely to have transitioned to injecting.

Counselors recruited recently-enrolled clients from their caseloads. After all eligible and interested inhalers were interviewed, recently-admitted injectors were then interviewed. The interviewees were offered a \$30 honorarium. For the convenience of the patients, interviews were conducted by the first author in private offices in the treatment programs.

The analysis was done using SAS V8. Differences by route of administration were tested using χ^2 for categorical data and *t* tests for continuous data, with Pearson correlations run to determine which variables were significantly associated with each route. All differences discussed in the text are statistically significant at the .05 level unless otherwise noted. The project was approved by the Institutional Review Board of the University of Texas at Austin.

RESULTS

Patterns of Heroin Use by City

During the interviews, reasons given for inhaling heroin included being afraid of needles or of overdosing, having seen the effects of injecting (“they lose everything”), knowing the reputation of injectors as “junkies” and their low social status, or the fact that their habits have not grown to the point they need to inject. However, some respondents had never heard or thought about inhaling or snorting heroin; they were only exposed to people who injected. And while this study actively recruited inhalers, only 12% of those interviewed in Houston had originally been inhalers, as compared to 55% in Austin, 55% in Dallas, 67% in Fort Worth, and 82% in San Antonio.

In addition, the way heroin was packaged and the terms used to describe the doses varied among the cities. In Austin, heroin was sold in grams and balloons, and black tar heroin was usually cut with lactose to produce brown heroin. A gram quantity of black tar heroin, which would be about the size of a marble, would be packaged in black plastic or in a finger cot, while small colored water balloons were used to package a single dose or shot. In Dallas, heroin was sold as grams, in pills, or in “papers,” which were pieces of tin foil. It was usually cut with “dormin” and sold as a cap. In Fort Worth, heroin was sold as grams, “pills,” and “turds.” It was cut with mannite. In San Antonio, heroin was sold as “dimes,” “balloons,” “spoons,” or in grams, and was usually cut with lactose. Users in San Antonio reported a variety of ways to turn black tar into inhalable powder. In Houston, where inhaling was less common, heroin was sold in grams and was cut with lactose.

Demographic Characteristics

The cohort was divided into three groups: those who began as inhalers and stayed as inhalers (*n* = 33), those who began as inhalers and shifted to injecting (*n* = 73), and those who started as injectors and remained as injectors (*n* = 89). Some injectors reported occasionally inhaling under certain circumstances, but there was no movement from injecting to only inhaling. They would sometimes “snort” or “shebang” heroin for various reasons: to test its purity, when they did not have a “rig” or when the rig was clogged, when they could not find a vein, while in jail, or first thing in the morning “to keep the sick off.” Several reported they would shift to inhaling if they had to show their arms to their probation officers or if they thought their spouses would check their arms when they came home after a night on the

town. Others commented they would inhale heroin if they were at a party or club where they could not inject or if they were on the job. One client reported mixing up liquid heroin in an eyedropper bottle and taking it with him when he traveled. Injectors commented that inhaled heroin produced a high which was described as “*more mellow and not as intense*,” yet most considered inhaling to be an uneconomical way to use heroin.

Of the 199 individuals interviewed, 22% were Anglo males, 23% were Anglo females, 18% were African American males, 6% were African American females, 18% were Hispanic males of Mexican heritage, and 13% were Hispanic females. In 2002, of the total 6,731 admissions to methadone programs statewide, 35% were Anglo males, 23% were Anglo females, 6% were African American males, 3% were African American females, 24% were Hispanic males and 9% were Hispanic females. Because heroin inhalers were a priority, African American males and females and Hispanic females are overrepresented in this study.

African Americans were more likely to be inhalers and Hispanics were more likely to have started as inhalers and shifted to injecting. Anglos tended to be injectors (Table 1). Mean education level was 12.1 years ($SD = 2.6$, range 0-23 years) and annual income at time of interview was \$16,245 ($SD = \$18,127$, range \$0-\$109,500). Twenty-nine percent were employed full time, 25% employed part-time, 39% were unemployed, and 7% were not in the labor force. Prior to admission, 48% reported no legal source of income and 26% said they received support from family or friends. Inhalers were significantly more likely to report their income came from wages. Females were less likely to report wages or salary as their means of support (39% vs. 61%, $p = .0028$) and more likely to report family or friends as their primary source of support (41% vs. 15%, $p < .0001$).

At admission to treatment, 74% lived with their families and 13% lived alone. Inhalers were more likely to live with their families. Forty-three percent of the clients were married or cohabiting with a partner, 33% were divorced, and 21% had never been married. Fifty-seven percent had children under the age of 18 living in the household with them. There was no difference between women and men in terms of living with family and having minor children in the household.

Sixty-eight percent of the clients were in private programs and 32% were in publicly-funded programs; there was no difference in program types by route of administration. The race/ethnic distribution in the private programs was 58% Anglo, 4% African American, and 38% Hispanic, while in the public programs it was 22% Anglo, 63% African American, and 15% Hispanic. Males comprised 55% of clients in private programs and 65% in public programs. Clients in private programs were more likely than clients in public programs to be employed full time at admission (39% vs. 9%, $p < .0001$), to have higher incomes (\$21,395 vs. \$7,567, $p < .0001$), more years of education (12.4 vs. 11.5 years, $p = .006$), to be younger (34.8 vs. 41.1 years, $p < .0001$), and to have health insurance (34% vs. 18%, $p = .01$). However, during the interviews, those who had insurance indicated that they did not use it to help pay their methadone treatment bills, as they did not want their insurance companies and their employers to know they were in treatment.

Substance Use Patterns and Problems

The mean age of first use of heroin was 21.6 ($SD = 7.7$, range 8-48) and age of first regular use of heroin was 24.0 ($SD = 7.8$, range 8-48) (Table 2). “Regular use” was often described as the time when heroin use had changed from occasional weekend use to more frequent use with the appearance of withdrawal symptoms, so that regular use was necessary. Or, as many clients described it, they now needed to use heroin “*to keep the sick off*.” Average age at admission to treatment in the program in which the interview took place was 37.3 years

($SD = 10.7$, range 19-65). Those who started as injectors were older than those who started as inhalers at this treatment admission and they reported more prior treatment episodes. Those who remained as inhalers had fewer problems based on the ASI. There was no difference between genders on any of the ASI scores.

The interviewees were also asked about the amount of heroin they were using at admission. Depending on the way heroin was sold and the terminology in the community, the quantity was reported by balloons (average 6 per day) or in grams (1.3 grams per day). Although the users stated that they would use as much heroin as they could obtain in a day, they estimated the average number of times they used “*to stay normal*” as 5 per day. The clients estimated they spent an average of \$121 per day on heroin. Although the differences were not significant, there was a tendency among those who remained as inhalers to report using more grams of heroin per day (1.7 grams vs. 1.2 grams for both groups of injectors). One of the reasons former inhalers gave for shifting to injecting was that their habits had become so large they were problematic. Some developed nasal problems, such as bleeding and obstruction, and they could not inhale enough heroin “*to stay normal*” with these nasal problems and with the lower-potency powdered heroin. Others shifted to injecting in the belief that they would need less heroin. However, the cost of the habits of injectors exceeded the cost of the habits as inhalers, as Table 2 shows. Females had more expensive heroin habits when they entered treatment (\$145 vs. \$105, $p = 0.02$) and they used heroin more times per day than did males (6.0 vs. 4.3 times, $p = 0.01$).

Fifty-two percent reported their second problem drug at admission was powder cocaine (79% injected it), 14% reported alcohol, 10% reported marijuana, 9% reported opiates other than heroin, and 6% reported crack cocaine. All of the heroin inhalers who had a second problem with powder cocaine inhaled their cocaine, while 93% of those who shifted to injecting heroin also injected cocaine, as did 100% of those who had always injected heroin (“*speedballing*”). Injecting cocaine preceded injecting heroin for 10% of those who started as heroin inhalers and for 18% of those who started as heroin injectors. Another 12% of injectors reported injecting methamphetamine first. Fifty-eight percent had used inhalants, and of these, 12% reported using various inhalants 50-199 times; 6% reported using inhalants more than 200 times.

Childhood and Family Conditions

As children, 61% were reared by both parents; those who started as injectors were more likely to have been reared by their fathers (Table 3). Fifty-nine percent of the clients reported they were usually close or very close to their mothers and 52% were close to their fathers. However, 11% reported their mothers were usually distant, as were 21% of their fathers. Another 22% reported their mothers were unpredictable (sometimes close, sometimes hostile), as were 10% of their fathers.

The parents of the clients also had substance abuse and psychiatric problems, but there were no differences by routes of administration, although injectors were more likely to report their siblings had drinking problems. Females were more likely than males to report their parents had problems related to drug use (36% vs. 18%, $p = .004$) and that their parents had problems related to alcohol use (59% vs. 40%, $p = .009$), as did their siblings (46% vs. 27%, $p = .009$).

The clients also tended to come from families who had been involved in the criminal justice system. Fifty-three percent reported their parents, stepparents, siblings, or aunts or uncles had spent a period of time in jail or prison. Family members also played a role in exposing these clients to alcohol and drugs. Some 26% reported that while they were minors, they

engaged in serious drinking with their relatives, and while minors, 30% used drugs with their relatives.

Abuse and Neglect

Thirty-seven percent reported running away from home for a day or more, and some did so frequently (Table 4). The modal number of times they ran away was 2 and the mean was 12. Nine percent reported running away 50 or more times. Females were more likely to have run away (50% vs. 27%, $p = .0012$), and they were more likely to report running away because of fights with their parents (37% vs. 10%, $p < .0001$), being abused sexually (15% vs. 7%, $p = .0006$), or being pregnant or afraid they were pregnant ($p = 0.017$).

The clients were queried if they had frequently, seldom, or never experienced neglect, poverty, or abuse as children and as adults, and those who shifted from inhaling to injecting were significantly more likely to report feeling unloved and unsafe as adults.

Those who had been emotionally or sexually abused as youths were also more likely to have been emotionally or sexually abused as adults ($p < .0001$). Twenty-nine percent of females and 29% of males reported they had suffered sexual abuse or rape as children and/or adults. Males were as likely as females to report that as children they had suffered sexual abuse or been raped ten or more times (9% each). Likewise, those who suffered sexual abuse as children or adults were significantly more likely to report frequently or seldom not having enough to eat, not having enough clothes to wear, having been abused emotionally, feeling unloved, feeling unsafe, and having been beaten. They also reported that as adults, they had not been cared for when sick, and as youths, had frequently or seldom been homeless. They also were more likely report their physical health and mental health status as “fair” or “poor” and to report not being close to either their mothers or fathers. There was no relationship between having committed the crime of prostitution in the last year and having been sexually abused as a child or as an adult.

The patients’ substance abuse problems were compounded by their living situations. Some 44% had lived with a spouse or partner who had a significant drinking problem, 68% had lived with a person who had a significant problem with drug use, and 47% had lived with someone with a psychological problem. Twenty-nine percent reported they were living with that person when they entered treatment. Forty-three percent had lived with someone who was involved in selling drugs and 52% had lived with someone who had spent a period of time in jail or prison. There was no statistical difference in living conditions between genders or by route of administration.

Mental and Physical Health Problems

Forty-eight percent of the clients described their mental health as only “fair” or “poor” (Table 5) and 62% said that mental health problems had significantly interfered with their lives or activities. Fifty-one percent of all the clients had seen a health professional for emotional or psychological problems, and 43% had been given a mental health diagnosis by a medical professional. The most common diagnosis was depression (22%), followed by bipolar disorder (8%) and anxiety (8%). Forty percent reported they had been prescribed a medication for their mental health problem, 34% were on such a medication at the time of the interview, and 14% said they had been hospitalized for their problem. Those who remained as inhalers or shifted to injecting were more likely to report mental health problems.

Some 47% of clients reported their physical health was “fair” or “poor” (Table 6). There was no difference in physical health between those who did and did not have health insurance, between males and females, or by route of administration. The most common

problem was hepatitis C (48%), and as a confirmation for this number, 54% reported they had liver problems. Only 5% reported they had HIV/AIDS.¹ Injectors were more likely to have had HCV, gonorrhea, liver problems, and HIV/AIDS.

Criminal Activities

The clients reported being in jail a mean of 9.8 times; on adult probation, 1.5 times; in prison, 1.9 times; and on parole, 1.6 times. Those who were always injectors were had more times in jail (13.8 times vs. 7.2 times for those who shifted from inhaling to injecting and 4.0 times for those who were always inhalers, $p = .008$). Males were more likely than females to have been in prison (2.1 times vs. 1.4 times, $p = .05$).

The most common crimes committed in the year prior to entering treatment were selling drugs other than crack cocaine and shoplifting (46% each), selling stolen goods (32%), other theft (26%), and forgery and credit card abuse (25%). For the most part, there were no differences in the types of crimes committed when route of administration was considered, except no inhalers reported having engaged in prostitution, as compared to 13.6% of those who shifted to injecting and 14.6% of injectors ($p = 0.075$). Inhalers were also less likely to have sold stolen goods (12.5% inhalers vs. 40.0% injectors who shifted and 34.8% of injectors, $p = 0.021$). Males were more likely to have committed bookmaking or illegal gambling (12% vs. 3%, $p = 0.02$) and pimping (11% vs. 0%, $p = .004$), while females were more likely to have committed prostitution (19% vs. 4%, $p = .0008$).

Factors Related to Route of Administration

When each route of administration was correlated with the different variables, those who stayed as inhalers were significantly less impaired on many of the measures used in this study. There were older at first use of heroin, younger at this treatment admission, living with their families, and supporting themselves through wages. Staying as an inhaler was also correlated with being African American, fewer treatment admissions, fewer times in jail, not having committed prostitution, and having fewer days of family, psychological, sickness, and employment problems on the ASI. They were less likely to feel unloved as youths or adults or to have had hepatitis C, gonorrhea, or liver problems, although they had sometimes or frequently thought about suicide.

Those who started as inhalers and shifted to injecting were more likely to be Hispanic and to be more impaired. Significant correlations included starting their regular use of heroin at a younger age, committing thefts, feeling unloved and unsafe as an adult, not being close to their mothers, having mothers with drinking problems, having mental health problems that interfered with their lives or activities, and sometimes or frequently having hallucinations.

Factors which positively correlated with starting as an injector included being Anglo, being older at this admission, having more times in jail and more prior treatment episodes, not having a salary as the main source of support, having siblings with drinking problems, and as youths and adults, not having had adequate clothing at times, as well as to having been more likely to have been raised only by their fathers, who were more likely to have psychological problems. Injectors reported more days of sickness and employment problems on the ASI, but they were less likely to have mental health problems. Beginning as an injector was also related to having hepatitis C, AIDS, and gonorrhea.

¹The proportion of HIV/AIDS cases may have been underreported by the respondents. The route of transmission of AIDS cases in Texas in 2002 was 20% for injecting drug use, 7% for males who had sex with males and also were injecting drug users, 20% for heterosexual, and 53% for males who had sex with males (Maxwell, J. C., "Substance Abuse Trends in Texas" in *Epidemiologic Trends in Drug Abuse, Proceedings of the Community Epidemiology Work Group June 2003*. Rockville, MD: National Institute on Drug Abuse, 2004).

DISCUSSION

This study used a purposive sample in an attempt to learn more about the unique characteristics of heroin inhalers and injectors in six treatment programs in Texas. Consequently, it does not represent the entire population of heroin users in treatment in Texas and it does not represent those who have not been in treatment. However, the characteristics of inhalers and injectors reported for this sample are in most cases similar to those found in our previous study, which was representative of all those in public programs in the state. The large proportion of African Americans who stayed as inhalers in this study is partially the result of an oversample of one program, although our earlier analysis of the statewide Texas data of public programs also found that African American heroin users were significantly more likely to be inhalers than injectors at admission to treatment. Further, this study found the same tendencies for inhalers to report fewer ASI sickness days as found in our statewide study (Maxwell et al., 2004).

This study found that route was influenced by the characteristics of the heroin available, such as its purity and ease of use. South American and Asian varieties, which are powdered, are rare in Texas, and clients who had used “white” heroin had either used it when they were on the East Coast or overseas or when a friend brought some back to Texas. The route was also influenced by the norms of the heroin users in the local community, and the differences in terminology and diluents used indicated that heroin users in Texas do not move around but tend to stay in the same local communities.

Consistent with their longer heroin careers, injectors are more impaired than inhalers in terms of employment, health problems, and criminality. Inhalers were less impaired in the sense of having a shorter history of heroin use, full-time employment, being supported by wages, and living with their families. However, many users who start out inhaling heroin are likely to shift to injecting as their career of heroin use progresses, and this group also had more problems in terms of family history and mental health problems. Identifying current inhalers who show evidence of some of these problems will provide treatment programs with strategic opportunities to intervene in the lives of heroin inhalers by offering intensive counseling services to lessen some of their childhood traumas and to build on positive strengths and resources through family counseling and parenting skills. Preventing the transition to injecting should be an important treatment outcome measure. Inhalers tend to have numerous areas of strength including intact families, jobs, and fewer areas of other life problems. Interventions with a strength-orientation would be a good fit for many inhalers.

Special attention should be given to retaining inhalers in treatment. Kelley and Chitwood (2004) found that contact with treatment significantly reduced the likelihood of transitioning to injection. During our interviews, many of the inhalers who were recent admissions seemed to be almost “euphoric” about the improvement in their lives while in treatment and they were looking forward to getting off methadone “soon.” Programs need to emphasize retention of these clients in treatment until they have achieved a stable lifestyle with drug-free friends and meaningful employment. Therapy should be a multi-prong approach that targets strategies to decrease the rewarding properties of drugs, to enhance the rewarding properties of alternative reinforcers, to intervene with conditioned-learned associations, and to strengthen cognitive control (Volkow et al., 2003).

While substance dependence is a chronic relapsing disorder (NIDA, 2004), for inhalers, relapse prevention should be a prominent therapeutic goal for those considering leaving treatment prematurely, since they are at high risk of blood-borne viruses if their relapse leads to injecting. Clients should be vaccinated for hepatitis B and tested for hepatitis C antibodies, as these are critical components in the response to the HCV epidemic among

drug users (Strauss et al., 2004). Those who are positive should be counseled to modify their behaviors to decrease alcohol consumption.

The finding that injectors tended to have fewer mental health problems shows that co-occurring conditions are not limited to the most impaired clients and that special attention to these issues with inhalers entering treatment for the first time might well prevent their progression to additional treatment episodes and injection. Nearly half of all clients described their mental health as fair to poor, and the mean mental health scores and levels of depression provide evidence of the need for treatment for co-occurring mental disorders. Antidepressant medication exerts a modest beneficial effect for patients with combined depressive and substance-use disorders; concurrent therapy directly targeting the addiction is also indicated (Nunes & Levin, 2004). And while this population has a history of the use of multiple substances, some had engaged in heavy use of inhalants, which can lead to cognitive damage (Korman et al., 1980; Rosenberg et al. 1988). Treatment providers should screen for cognitive disabilities (CSAT, 1998), as they may affect a person's learning style, making participation in didactic training and group interventions more difficult (Corrigan, 2003).

Because of the high rate of co-morbidity, it is highly appropriate to screen all clients, including inhalers, for co-occurring psychiatric disorders. Of course, those who screen positive should also be referred for assessment and treatment, as appropriate, for both disorders. Inhalers who are co-morbid are more likely to transition to injecting, particularly Hispanic inhalers. This need underscores the necessity for pervasive availability of Spanish version screening instruments as well as bi-lingual and bi-cultural clinicians.

Only a quarter of the patients had health insurance, so care for their mental and physical problems was not readily available for many. Drug and alcohol-dependent persons without primary care have a significant burden of medical illness; their physical health status is worse than in the general U.S. population (De Alba et al., 2004). Given the high level of physical problems reported by patients in our study, the scope of narcotic treatment programs should be expanded beyond merely treating an individual's opiate dependence to include treatment for other physical and mental conditions. Since methadone patients are frequent visitors to their drug treatment programs, care for a range of problems should be delivered within the context of the program. It would seem that the physician supervising the methadone treatment should, in many instances, be functioning as the primary care physician for those patients who do not have access to another primary care physician, and the programs should assume responsibility to see that patients not only are referred for specialty care, but should assist in getting clients on Medicaid or other health care programs, making appointments, providing transportation when needed, and assisting in securing needed medications. Future studies should examine whether extra expenditures in providing "wrap around" services including mental health and physical health treatment, educational, vocational, family and parental counseling, voucher incentives, or other special services are justified in terms of long-term social benefit and savings.

The family backgrounds of the patients indicate need for clinical awareness of posttraumatic stress disorder issues related to childhood trauma and the familial influences in terms of living with parents and siblings who had substance abuse and psychiatric problems. Not only were some of these patients impoverished in terms of homelessness, hunger, and inadequate clothing as children, but they felt unloved and were subjected to emotional and physical abuse. These same patterns continued into adulthood. In addition, risky behaviors such as living with others who are still using and abusing substances and continuing to be involved with deviant peer groups should be addressed. Clients should understand the need

to develop new and healthier lifestyles prior to leaving methadone treatment (Lambert, 1998).

One finding from this study was that males were as likely as females to have been sexually abused as children or as adults, and based on the interviews with the male patients, this was an area that had never been explored with many of them by their counselors at the programs. Counselors may only be addressing this topic with those who admit to prostitution, but this study found no statistical relationship between having committed prostitution and having been sexually abused. Sexual abuse should be addressed with male as well as with female clients. In addition, the study found that the reported rate of prostitution was low and different results might have been obtained if the question had, instead, been about trading sex for money or for drugs.

Not only is there a continuing need for additional treatment capacity and more comprehensive services for persons dependent on heroin, but there is a need to overcome the stigma that methadone programs have among many users on the street so that individuals will be encouraged to enter treatment much sooner. Increased awareness is also needed regarding the availability of treatment programs and the importance of treatment as a means to prevent hepatitis C and HIV. Knowledge of the availability of treatment was not widespread: when asked for the reason why the individual came to a specific program, it was often through the recommendation of a friend who had been in treatment in that particular program or else the client had looked it up in the telephone book or saw an ad in the newspaper.

CLINICAL RECOMMENDATIONS

- Retain inhalers in treatment to prevent relapse and transition to injecting.
- Provide family counseling and parenting skills to build on positive strengths and resources.
- Vaccinate clients for HBV, screen all clients for HCV, and counsel hepatitis-positive patients on modifying behaviors to lessen liver damage.
- Expand the role of the program physician to provide primary health care for unserved clients.
- Screen all patients for mental health problems, including childhood and adult abuse, and provide counseling for problems and refer to more intensive mental health services as appropriate.
- Address sexual abuse among males as well as females.

Acknowledgments

The authors wish to thank the program directors, staff, and clients who participated in this study.

This research was supported by NIH/NIDA Grant #1 R21 DA014744.

Biography

Jane Carlisle Maxwell is co-investigator on a grant from the National Institute on Drug Abuse and is director for the Center for Excellence in Drug Epidemiology of the Gulf Coast Addiction Technology Research Center. She has been a member of the National Advisory Council of the Substance Abuse and Mental Health Services Administration and is currently a member of the Drug Advisory Committee of the Food and Drug Administration's Center

for Drug Evaluation and Research, and the National Institute on Drug Abuse's Community Epidemiology Work Group. She formerly was with the Texas Commission on Alcohol and Drug Abuse.

Dr Spence is director of the Addiction Research Institute and the Gulf Coast Addiction Technology Transfer Center located at the University of Texas, and is principal investigator for two current research grants funded by the National Institute on Drug Abuse. He formerly served on the staff of the National Institute on Drug Abuse and the National Institute on Alcohol Abuse and Alcoholism and also served for 16 years as director of Research and Technology Transfer at the Texas Commission on Alcohol and Drug Abuse.

REFERENCES

- Breslau L. Depressive symptoms, major depression, and generalized anxiety: A Comparison of self-reports on CES-D and results from diagnostic interviews. *Psychiatric Research*. 1985; 15:219–229.
- Carpenter MJ, Chutuape MA, Stitzer ML. Heroin snorters versus injectors: Comparison on drug use and treatment outcome in age-matched samples. *Drug and Alcohol Dependence*. 1998; 53:11–15. [PubMed: 10933336]
- Center for Substance Abuse Treatment. Substance use disorder treatment for people with physical and cognitive disabilities: Treatment improvement protocol series 29. Rockville, MD: 1998.
- Corrigan, J. Relationship between traumatic brain injury and substance abuse. 2003. Retrieved September 12, 2003 from <http://www.ohiovalley.org/abuse/>
- De Alba I, Samet JH, Saitz R. Burden of medical illness in drug- and alcohol-dependent persons without primary care. *American Journal on Addictions*. 2004; 13:33–45. [PubMed: 14766436]
- Des Jarlais DC, Casriel C, Friedman SR, Rosenblum A. AIDS and the transition to illicit drug injection—results of a randomized trial prevention program. *British Journal of Addiction*. 1992; 87:493–398. [PubMed: 1559048]
- Drug Enforcement Administration. 2002 Domestic Monitor Program. U. S. Department of Justice; Washington DC: 2003. DEA-03057
- Frank, Blanche. An overview of heroin trends in New York City: Past, present and future. *The Mount Sinai Journal of Medicine*. 2002; 67:340–346.
- Fuller CM, Vlahov D, Ompad DC, Shah N, Arria A, Strathdee SA. High-risk behaviours associated with transition from illicit non-injection to injection drug use among adolescent and young adult drug users: a case-control study. *Drug and Alcohol Dependence*. 2002; 66:189–198. [PubMed: 11906806]
- Gossop M, Powis B, Griffiths P, Strang. Multiple risks for HIV and hepatitis B infection among heroin users. *Drug and Alcohol Review*. 1994; 13:293–300. [PubMed: 16818341]
- Gossop M, Steward D, Marsden J, Kidd T, Strang J. Changes in route of drug administration among continuing heroin users: Outcomes 1 year after intake to treatment. *Addictive Behaviors*. 2004; 29:1085–1094. [PubMed: 15236809]
- Griffiths P, Gossop M, Powis B, Strang J. Extent and nature of transitions of route among heroin addicts in treatment—preliminary data from the Drug Transitions Study. *British Journal of Addiction*. 1992; 87:485–491. [PubMed: 1559047]
- Griffiths P, Gossop M, Powis B, Strang J. Transitions in patterns of heroin administration: A study of heroin chasers and heroin injectors. *Addiction*. 1994; 89:301–309. [PubMed: 8173499]
- Kelley MS, Chitwood DD. Effects of drug treatment for heroin sniffers: a protective factor against moving to injection? *Social Science and Medicine*. 2004; 58:2083–2092. [PubMed: 15020021]
- Kerber, L. Substance use among male inmates: Texas Department of Criminal Justice-Institutional Division, 1998. Texas Commission on Alcohol and Drug Abuse; Austin, TX: 2000.
- Kerber, L. Substance use among female inmates: Texas Department of Criminal Justice-State Jail Division, 1998. Texas Commission on Alcohol and Drug Abuse; Austin, TX: 2001a.
- Kerber, L. Substance use among male inmates: Texas Department of Criminal Justice-State Jail Division, 1998. Texas Commission on Alcohol and Drug Abuse; Austin, TX: 2001b.

- Kerber, L.; Harris, R. Substance use among female inmates entering the Texas Department of Criminal Justice-Institutional Division, 1998. Texas Commission on Alcohol and Drug Abuse; Austin, TX: 2001.
- Kerber, L.; Maxwell, J.; Wallisch, L. Substance use among offenders entering the Texas Department of Criminal Justice-Substance Abuse Felony Punishment Facilities, 1998-2000. Texas Commission on Alcohol and Drug Abuse; Austin, TX: 2001.
- Korman M, Trimboli F, Semler I. A comparative evaluation of 162 inhalant users. *Addictive Behaviors*. 1980; 5:143–152. [PubMed: 7405658]
- Lambert RC. The effects of treatment for opiate addiction on health promoting behavior. *Journal of Maintenance in the Addictions*. 1998; 1:45–66.
- Maddux, JF.; Desmond, DP. *Careers of Opioid Users*. Praeger Press; New York: 1981.
- Maxwell JC, Bohman T, Spence RT. Differences in characteristics of heroin inhalers and heroin injectors at admission to treatment: A preliminary study using a large database of client records. *Substance Use and Misuse*. 2004; 39(6):989–1008.
- McLellan AT, Luborsky L, Woody GE, O'Brien CP. An improved evaluation instrument for substance abuse patients: the Addiction Severity Index. *Journal of Nervous and Mental Disease*. 1980; 168:26–33. [PubMed: 7351540]
- National Institute on Drug Abuse. Drug Abuse Trends and Research Issues, Community Epidemiology Work Group Proceedings, December 1986. National Institute on Drug Abuse; Rockville, MD: 1987. Black tar heroin; p. III-1-9.
- National Institute on Drug Abuse. Lapse or relapse to drug abuse and other chronic conditions. November 24. 2004 RFA Number: RFA-DA-05-004. Downloaded from <http://www.nida.nih.gov>
- Neaigus A, Miller M, Friedman SR, Hagen DL, Sifaneck SJ, Ildefonso G, Des Jarlais DC. Potential risk factors for the transition to injecting among non-injecting heroin users: A comparison of former injectors and never injectors. *Addiction*. 2001; 96:847–860. [PubMed: 11399216]
- Nunes EV, Levin FR. Treatment of depression in patients with alcohol and or other drug dependence: a meta-analysis. *Journal of the American Medical Association*. 2004; 291(15):1887–1896. [PubMed: 15100209]
- Rosenberg N, Spitz M, Filley C, Davis K, Schaumburg H. Central nervous system effects of chronic toluene abuse-clinical, brainstem evoked response and magnetic resonance imaging studies. *Neurotoxicology and Teratology*. 1988; 10:489–495. [PubMed: 3247003]
- Strang J, Des Jarlais DC, Griffiths P, Gossop M. The study of transitions in the route of drug use: The route from one route to another. *British Journal of Addiction*. 1992; 87:473–483. [PubMed: 1559046]
- Strang J, Griffiths P, Gossop M. Heroin in the United Kingdom: Different forms, different origins, and the relationship to different routes of administration. *Drug and Alcohol Review*. 1997b; 16:329–337. [PubMed: 16203446]
- Strang J, Griffiths P, Powis B, Abbey J, Gossop M. How constant is an individual's route of heroin administration? Data from treatment and non-treatment samples. *Drug and Alcohol Dependence*. 1997a; 46:115–118. [PubMed: 9246559]
- Strauss SM, Astone JM, Des Jarlais D, Hagan H. A comparison of HCV antibody testing in drug-free and methadone maintenance treatment programs in the United States. *Drug and Alcohol Dependence*. 2004; 73:227–236. [PubMed: 15036545]
- Volkow ND, Fowler JS, Wang G-J. The addicted human brain: insights from imaging studies. *The Journal of Clinical Investigation*. 2003; 111(10):1444–1451. [PubMed: 12750391]

TABLE 1

Sociodemographic Characteristics of Surveyed Patients

	All Clients (n = 199)	Always Inhale (n = 33)	Shift to IDU (n = 73)	Always Inject (n = 89)	p
Anglo	44.9%	34.4%	38.4%	53.9%	0.059
African American	23.7%	40.6%	15.1%	24.7%	0.017
Hispanic	31.4%	25.0%	46.6%	21.4%	0.002
Male	58.8%	56.3%	56.2%	61.8%	0.732
Prior Treatment Episodes	3.3	1.7	3.2	4.1	<.0001
Years Schooling	12.1	12.7	11.9	12.1	0.389
Annual Income	\$16,245	\$18,036	\$16,539	\$15,121	0.774
Children in the Household	57.2%	68.8%	52.1%	57.3%	0.282
Live with Family	73.7%	90.6%	71.2%	69.7%	0.034
Full Time Employment	28.9%	37.5%	27.4%	27.0%	0.498
With Income from Wages	51.6%	68.8%	54.8%	42.7%	0.032
With Income from Family	25.8%	28.1%	27.4%	23.6%	0.813
With Income from Illegal Activities	8.8%	3.1%	11.0%	9.0%	0.424
Times in Jail	9.8	4.0	7.2	13.8	0.008

TABLE 2

Substance Use Patterns and Problems of Patients Surveyed

	All Clients	Always Inhale	Shift to IDU	Always Inject	<i>p</i>
Age When First Tried Heroin	21.6	24.1	21.4	20.9	0.123
Age Regular Use of Heroin	24.0	26.0	23.0	24.0	0.187
Age This Treatment Admission (yrs.)	37.3	33.0	34.6	41.1	<.0001
Times Used Heroin/Day	5.0	5.1	5.7	4.5	0.209
Daily Cost of Heroin Habit	\$121	\$96	\$119	\$132	0.243
# Days Drug/Alcohol Use Problems	21.7	15.9	22.7	23.3	0.076
# Days Employment Problems	13.9	8.2	10.2	20.0	0.009
# Days Family/Marital Problems	12.5	4.1	15.8	12.8	0.009
# Days Psychological Problems	19.0	10.1	22.3	19.6	0.003
# Days Sickness/Health Problems	7.4	2.1	4.4	13.4	0.001
# Days Peer/Social Problems	5.6	1.8	7.5	5.2	0.179

TABLE 3

Family Background of Patients

	All Clients	Always Inhale	Shift to IDU	Always Inject	<i>p</i>
Primary Family Arrangement While Growing Up					
Both Parents	61.3%	62.5%	64.4%	58.4%	0.733
Mother	24.7%	31.3%	23.3%	23.6%	0.646
Father	4.1%	0.0%	1.4%	7.9%	0.029
Other Relative/Person	9.3%	6.3%	11.0%	9.0%	0.740
Any Family Member Ever Had Substance Abuse or Psychiatric Problem					
Parental Drinking Problem	47.9%	43.8%	49.3%	48.3%	0.867
Parental Drug Problem	25.3%	31.3%	27.4%	21.4%	0.471
Parental Psychiatric Problem	41.8%	31.3%	39.7%	47.2%	0.265
Sibling Drinking Problem	34.5%	25.0%	24.7%	46.1%	0.008
Sibling Drug Problem	42.8%	28.1%	41.1%	49.4%	0.105
Sibling Psychiatric Problem	31.4%	21.9%	30.1%	36.0%	0.324
Any Family Member Ever Incarcerated	52.1%	37.5%	53.4%	56.2%	0.185

TABLE 4

Percentage of Patients Who Suffered Neglect, Poverty, or Abuse

	All Clients	Always Inhale	Shift to IDU	Always Inject	<i>p</i>
During Childhood					
Felt unloved	36.1%	18.8%	41.1%	38.2%	0.062
Homeless	13.9%	15.6%	11.0%	15.7%	0.652
Not enough to eat	19.6%	21.9%	16.4%	21.4%	0.690
Not cared for when sick or hurt	11.9%	9.4%	13.7%	11.2%	0.795
Inadequate clothing	12.4%	12.5%	5.5%	18.0%	0.044
Left by self when too young	23.7%	21.9%	26.0%	22.5%	0.839
Felt unsafe or in danger	27.8%	18.8%	31.5%	28.1%	0.405
Beatings or physical abuse	26.3%	28.1%	26.0%	25.8%	0.967
Mentally or emotionally abused	40.0%	31.3%	42.5%	41.6%	0.524
Sexual abuse/rape	24.2%	15.6%	30.1%	22.5%	0.243
Ever ran away from home	36.7%	25.8%	38.9%	38.6%	0.392
# Times ran away	12.1	3.5	8.5	16.6	0.230
As an Adult					
Felt unloved	51.0%	34.4%	60.3%	49.4%	0.047
Homeless	45.4%	34.4%	45.2%	49.4%	0.340
Not enough to eat	37.6%	28.1%	39.7%	39.3%	0.478
Not cared for when sick or hurt	26.3%	18.8%	30.1%	25.8%	0.471
Inadequate clothing	23.7%	18.8%	17.8%	30.3%	0.135
Felt unsafe or in danger	46.9%	34.4%	56.2%	43.8%	0.088
Beatings or physical abuse	55.2%	46.9%	61.6%	52.8%	0.312
Mentally or emotionally abused	35.1%	28.1%	41.1%	32.6%	0.353
Sexual abuse/rape	13.9%	15.6%	16.4%	11.2%	0.607
Attacked with a weapon	54.1%	53.1%	56.2%	52.8%	0.906

TABLE 5

Percentage of Patients Who Had Psychological Problems

	All Clients	Always Inhale	Shift to IDU	Always Inject	<i>p</i>
CES Depression Score	20.4	21.3	19.7	20.4	0.376
My mental health is "fair" or "poor"	47.9%	46.9%	49.3%	47.2%	0.956
I avoid reminders of painful events	56.7%	56.3%	60.3%	53.9%	0.719
I feel anxious or have a lot of tension	70.1%	78.1%	76.7%	61.8%	0.066
I have difficulty imagining future	57.7%	59.4%	60.3%	55.1%	0.783
I feel suspicious or distrustfulness of people	55.7%	65.6%	54.8%	52.8%	0.449
I have upsetting memories/dreams	56.2%	65.6%	61.6%	48.3%	0.118
I cannot remember certain periods of my life	45.9%	43.8%	49.3%	43.8%	0.757
I get into arguments or fights with people	40.7%	46.9%	38.4%	40.5%	0.714
I have hallucinations	10.3%	12.5%	16.4%	4.5%	0.041
I have serious thoughts of suicide	9.8%	21.9%	8.2%	6.7%	0.040
I have attempted suicide	5.2%	6.3%	6.9%	3.4%	0.581

TABLE 6

Percentage of Patients Who Ever Had Specific Health Problems

	All Clients	Always Inhale	Shift to IDU	Always Inject	<i>p</i>
Physical Health "Fair" or "Poor"	46.9%	37.5%	43.8%	52.8%	0.265
Hepatitis B	20.6%	25.0%	20.6%	19.1%	0.779
Hepatitis C	47.9%	25.0%	48.0%	56.2%	0.010
Syphilis	6.7%	6.3%	6.9%	6.7%	0.993
Gonorrhea	24.7%	9.4%	19.2%	34.8%	0.006
HIV/AIDS	5.2%	3.1%	1.4%	9.0%	0.064
High Blood Pressure	25.3%	15.6%	28.8%	25.8%	0.356
Heart Problems	15.0%	6.3%	15.1%	18.0%	0.280
Pneumonia	25.8%	21.9%	26.0%	27.0%	0.851
Chronic Lung Disease	7.2%	6.3%	6.9%	7.9%	0.944
Diabetes	8.8%	12.5%	6.9%	9.0%	0.638
Liver Problems	54.1%	31.3%	56.2%	60.7%	0.015
Cancer	3.6%	3.1%	2.7%	4.5%	0.827
Kidney Infections	21.1%	21.9%	17.8%	23.6%	0.664