

# Drug and Alcohol Treatment Services Effective for Methamphetamine Abuse

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**Background.** *Methamphetamine abuse has become a major public health problem as demonstrated by increases in the number of emergency room visits, substance abuse treatment episodes, and arrests attributable to methamphetamine manufacture and abuse. We examine the effectiveness of conventional substance abuse treatment in the recovery of individuals seeking voluntary treatment for methamphetamine abuse.*

**Methods.** *At the request of the Iowa Department of Public Health, the Iowa Consortium for Substance Abuse Research and Evaluation contacted clients who had been admitted to voluntary treatment for methamphetamine abuse. Staff from the Consortium asked subjects to volunteer for follow-up interviews at designated intervals following admission. Agency staff conducted interviews based on the Mini International Neuropsychiatric Interview (MINI) at admission and at designated intervals and reported results to the Consortium for analysis.*

**Results.** *Subjects were predominantly Caucasian and over one half were female with an average age of 30 years. The criminal justice system was a primary referral source. Reported psychiatric symptoms dropped substantially in the first 60 days following admission and appeared to remain low at 6 and 12 months. Most clients reported abstinence and employment and denied arrests at the 6-month interview. Outcomes were not correlated with psychiatric symptoms.*

**Conclusions.** *Psychiatric symptoms improved over time with usual substance abuse treatment. There was no evidence that referral by the court system or symptoms of antisocial personality disorder affected outcome. Conventional treatment resulted in sobriety, employment, and fewer arrests at 6 and 12 months following treatment.*

**Keywords** Methamphetamine; Substance abuse; Treatment; Outcome.

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## INTRODUCTION

Amphetamine and methamphetamine ("meth") are the most widely abused drugs after marijuana worldwide (1–3). Methamphetamine is a stimulant that may be smoked, snorted, injected, or taken orally; it can be imported or manufactured. The "meth problem" has become mainstreamed, moving into suburbs and rural areas, becoming particularly widespread across the Midwest United States, and being used by high school and college students (4).

Methamphetamine is finding new users in part due to the pharmacology that contributes to a lengthy intoxication characterized by increased goal-directed activity and weight loss (2,3). According to the 2000 National Household Survey on Drug Abuse, approximately 8.8 million Americans had tried methamphetamine at some point in their lives (5). By 2002, this number had risen to 12.4 million Americans (or 5.3% of the United States population) (6).

Methamphetamine has become an urgent public health concern. The number of methamphetamine labs has increased dramatically over recent years. Methamphetamine may be made in small quantities from common substances (3,7) such as diet pills (ephedrine) and decongestants (pseudoephedrine) leading some retailers to remove them from pharmacy shelves. Acetone (fingernail polish remover), isopropyl alcohol (rubbing alcohol), lye (soaps and detergents), drain cleaner, battery acid, antifreeze, and freon (coolant) are among other common ingredients. Plastic buckets, bed sheets, glassware, filters, and pressurized gas cylinders may also be used in the manufacturing of methamphetamine. In addition to producing a highly variable substance (estimated at 20–30% purity in some areas), methamphetamine manufacture is a highly volatile process involving the exposure of solvents to heat and/or the "cooking" of unstable substances and reactive metals under pressure (8).

Following a decline in the mid 1990s, hospital emergency department visits related to the use of methamphetamine rose 169% from 1999 to 2002 (9). Methamphetamine involvement in drug-related deaths rose nationwide and occurred most frequently in the Midwest and Western states. The number of people seeking treatment for methamphetamine abuse has increased as well. Nationally in 1992 there were approximately 14,554 admissions for treatment for methamphetamine and that number rose more than 5 fold to 80,678 by 2001 (10). Some treatment providers believe that unique treatment programs need to be developed to address special needs of methamphetamine addicts who often present with psychiatric symptoms, legal problems, and treatment non-compliance. In this study we assessed the effectiveness of substance abuse treatment for people presenting with primary abuse of methamphetamine.

## METHODS

### *Subjects*

At the request of the Iowa Department of Public Health, the Iowa Consortium for Substance Abuse Research and Evaluation contacted clients who had been admitted to treatment for methamphetamine abuse. The clients were involved in a Targeted Capacity Expansion program (TCE) to provide extended lengths of stay, enhance existing services, and expand methamphetamine treatment of adults. Services were provided by five agencies in the Des Moines, Iowa area. Clients were voluntarily admitted to one of the five facilities and provided with routine substance abuse treatment by trained counselors within each facility consisting generally of group therapy, individual case management, and psychiatric assessment and referral in a semi-structured environment. Treatment did not follow a specific protocol but was administered by trained substance counselors, whose training included knowledge about methamphetamine. Treatment duration was hoped to be at least 60 days. Individuals presenting in psychiatric or medical crisis were placed in acute care settings rather than residential substance abuse treatment.

Staff from the Iowa Consortium for Substance Abuse Research and Evaluation independently contacted the clients and asked them to volunteer for follow-up interviews at 6 and 12 months post discharge date. Subject recruitment did not extend through the duration of the project and clients were not recruited if their follow-up time would clearly extend past the grant period. The University of Iowa Institutional Review Board approved this study and subjects were provided with verbal informed consent in compliance with accepted procedures.

Of the 301 clients admitted over three years of the TCE study, we attempted to recruit 228 people into the study during the second and third years. Twelve clients refused to participate in follow-up interviews, and five clients later withdrew their consent. Clients received an abbreviated and simplified version of the Mini International Neuropsychiatric Inventory (MINI) (11) at admission and 60 days following admission. The sections of the MINI that focused on symptoms of mood disorders, anxiety disorders, and antisocial personality disorder were used. Agency staff conducted MINI interviews and reported results to the Consortium for analysis. Information was received from the facilities on 199 of the possible 228 clients. There were 199 MINI interviews obtained and reported on admission and 86 obtained and reported for the initial 60-day follow-up. We restrict our analyses to those 199 subjects who had initial information and consented to follow-up and received the MINI interview on admission.

Of the 199 subjects designated for follow-up, 104 six-month and 69 twelve-month follow-up interviews were obtained. Failure to follow-up occurred when the interview times fell outside the data collection period ( $n = 45$ ), potential participants could not be located for recruitment ( $n = 29$ ), and subjects could not be located for follow-up ( $n = 22$ ). Less frequent reasons for failure to obtain follow-up data included client incarceration and client discharge after the follow-up time. If a client was not recruited or interviewed by the 6-month follow-up, the case was closed and no further contact was attempted.

## RESULTS

Client characteristics are shown in Table I. Subjects were predominantly Caucasian. The majority of subjects in the study were women. The average age was approximately 30 years, with one half of the clients falling between ages 24 and 36. Approximately one third (37.6%) of the subjects had not finished high school. Of those who had not finished high school, one-third (33.8%) had earned a General Education Degree (GED). Most (71.4%) clients were unemployed and seeking employment. Clients were generally never married (46.7%) or divorced (29.7%). While many (31.7%) of the clients were living with a partner, approximately 1 in 5 were living with their parents and another 1 in 10 were living with other family members. Clients had an average of 1.5 children ( $SD = 1.3$ ) and nearly 1 in 5 reported living with their child. The three most frequent referral sources to treatment were the criminal justice system (31%) followed closely by substance abuse counselors (25%) with relatively few (19%) being self-referred. Other referral sources such as family, friends, schools, employers, and healthcare providers accounted for the remaining referral sources. The mean length of stay was 86 days with a range of 2 days to 377 days and a median length of stay of 69 days.

Although just less than one third of subjects reported only one substance, most subjects (over 60%) used 1 or more substances in addition to methamphetamine. Coding included up to 3 substances per subject. Excluding methamphetamine, the most frequent mention was for marijuana (50.5% of mentions). Alcohol accounted for nearly a third of other mentions (31.1%). Cocaine/crack accounted for 9.2% and heroin, 3.6%. Other substance accounted for 2% or less each. Almost 80% of the sample noted that it had been one month or more since the last use of substance and only approximately 10% reported use within the last week prior to presentation for admission.

Table II shows the psychiatric symptom clusters identified in the full sample and for the 86 subjects for which results were available at admission and 60-day follow-up. Of the individuals ( $n = 86$ ) receiving both an abbreviated MINI on admission and at 60 days, over half (44/86) pre-

**Table I** Client Characteristic at Admission

|  |                  |
|--|------------------|
| Age (mean/SD)  | 30.5 (SD = 7.63) |
| Sex  |                  |
| Male   | 42.7%            |
| Female   | 57.3%            |
| Race/ethnicity   |                  |
| Black or African American                              | 1.6%             |
| Asian  | 0.5%             |
| American Indian  | 1.6%             |
| Caucasian  | 96.4%            |
| Hispanic/Latino?                                       |                  |
| Yes  | 3.6%             |
| No   | 96.4%            |
| Highest level of education?                            |                  |
| <12  | 37.6%            |
| 12   | 41.6%            |
| >12  | 20.8%            |
| If less than 12 years of education, do you have a GED? |                  |
| Yes  | 33.8%            |
| No   | 66.2%            |
| Are you currently employed?                            |                  |
| Employed full time (35+ hours per week)                | 16.3%            |
| Employed part time                                     | 4.6%             |
| Unemployed, looking for work                           | 71.4%            |
| Unemployed, disabled                                   | 7.7%             |
| Marital status   |                  |
| Never married  | 46.7%            |
| Divorced   | 29.7%            |
| Married  | 13.1%            |
| Separated  | 10.1%            |
| Widowed  | 0.5%             |
| With whom do you usually live?                         |                  |
| With parents   | 20.6%            |
| With sexual partner and children                       | 16.6%            |
| With sexual partner alone                              | 15.1%            |
| Alone  | 15.1%            |
| With family  | 11.6%            |
| With children alone                                    | 9.1%             |
| With friends   | 6.5%             |
| Controlled environment                                 | 0.5%             |
| No stable arrangements                                 | 5.0%             |
| Are there any children living with you?                |                  |
| Yes  | 19.8%            |
| No   | 80.2%            |

sented with at least one category of significant symptoms as measured by the abbreviated MINI. One fourth (21/86) of individuals had two or more significant symptoms as measured by the abbreviated MINI.

In the total analyzed sample, almost half (97 of 199) of the subjects reported significant symptoms of anxiety, abnormal mood, bulimia, and/or antisocial personality disorder on the abbreviated MINI. Approximately 30% of clients had significant symptoms of antisocial personality disorder at baseline. Individuals with symptoms of antisocial personality disorder had more other current (Mann-Whitney  $z = 3.61$ ,  $p < 0.001$ ) and lifetime (Mann-Whitney  $z = 3.90$ ,  $p < 0.001$ )

**Table II** Positive Current Symptom Screens from the Mini International Psychiatric Inventory (MINI)

|                                | Clients with Follow-up:             |                               |   |
|--------------------------------|-------------------------------------|-------------------------------|---|
|                                | All Admissions<br>( <i>n</i> = 199) | Admission<br>( <i>n</i> = 86) | 60-day<br>Follow-up<br>( <i>n</i> = 86) |
| Eating disorders               |                                     |                               |   |
| Anorexia                       | 0.0%                                | 0.0%                          | 0.0%                                    |
| Bulimia                        | 2.5%                                | 2.3%                          | 0.0%                                    |
| Anxiety disorders              |                                     |                               |   |
| Compulsions                    | 11.6%                               | 10.5%                         | 2.3%*                                   |
| Obsessions                     | 11.6%                               | 10.5%                         | 2.3%*                                   |
| Obsessive compulsive disorder  | 7.5%                                | 7.0%                          | 1.2%                                    |
| Panic disorder                 | 6.0%                                | 5.8%                          | 2.3%                                    |
| Post traumatic stress disorder | 6.0%                                | 9.3%                          | 2.3%                                    |
| Social phobia                  | 10.1%                               | 10.5%                         | 2.3%*                                   |
| Generalized anxiety            | 13.1%                               | 14.0%                         | 4.7%*                                   |
| Affective disorders            |                                     |                               |   |
| Hypomania                      | 6.0%                                | 5.8%                          | 0.0%                                    |
| Mania                          | 4.5%                                | 5.8%                          | 1.2%                                    |
| Major depression               | 25.6%                               | 26.7%                         | 5.8%**                                  |
| Personality disorder           |                                     |                               |   |
| Antisocial personality         | 30.2%                               | 30.2%                         | 26.7%                                   |

\*McNemar's test for the significance of change exact *p*-value < 0.05.

\*\*McNemar's test for the significance of change exact *p*-value < 0.001.

symptoms than those without symptoms of antisocial personality disorder.

While all symptom clusters occurred at lower frequencies at the 60-day follow-up, only depression, generalized anxiety, social phobia, obsessions, and compulsions were statistically likely to resolve by the 60-day follow-up evaluation. Of these 44 symptomatic subjects, 36 reduced their symptoms, 7 clients showed no change and one client gained one symptom (Wilcoxon signed rank  $S = -342$ ,  $p < 0.001$ ). The average number of symptoms resolved was 1.9 ( $SD = 1.95$ ).

While there was limited outcome information from the participating facilities at the 6-month follow-up interview, 51 of the 104 clients available for follow-up were assessed with the abbreviated MINI. The presence of measured symptoms did not predict outcome as measured by employment, sobriety, and arrest rate (all *p*-values > 0.34). Most clients reported abstinence from any substance use (72.6%), 88.2% were arrest free during the 6 months after treatment, and 51% had full time employment at the time of the interview. Further analyses of the group of subjects identified as having symptoms of antisocial personality disorder showed that this disorder by itself did not relate to any outcome measure (all *p*-values > 0.27). Similarly, the group of individuals referred by the criminal justice system did not differ on outcome measures (all *p*-values > 0.12).

## DISCUSSION

The results of this study indicated that many patients admitted to voluntary residential substance abuse treatment programs for the treatment of methamphetamine abuse had significant symptoms of anxiety, depression, and antisocial personality traits. These patients benefited from multidisciplinary substance abuse treatment. In general, measured symptoms lessened for most individuals. However, approximately one fifth (9 of 47) of people who presented with no lifetime psychiatric symptoms initially developed one or more symptoms, almost two-thirds (11 of 18) of people who had one symptom at admission, had one or more symptoms at 60 days, and 5 of 42 subjects with no measured symptoms at the time of admission, developed symptoms during the course of follow-up demonstrating the need for frequent evaluation of the status of symptoms throughout the course of recovery. Clients reported abstinence, employment, and low rearrest rates regardless of the number or type of measured psychiatric symptoms detected at initial presentation. Psychiatric symptoms were not positively or negatively correlated with outcome. In this study treatment of stimulant dependence was effective in lowering reported symptoms of depression and anxiety suggesting that healthcare costs may be lowered.

This sample has a lower incidence of depression than some samples and may exclude more seriously mentally and medically ill individuals since persons presenting in medical or psychiatric crisis were referred to acute treatment settings. Almost two thirds of these subjects had one or more months of reported sobriety at the time of entry into treatment, likely due to incarceration or supervision by the criminal justice system. According to our analysis of the Substance Abuse and Mental Health Services Administration, Office of Applied Studies Treatment Episode Data Set (TEDS): 1992–2001 (SAMHSA TEDS) [9] recording collected data on all substance abuse treatment admissions reported to SAMHSA, only 15% of persons listing stimulants as the primary substance of choice endorsed psychiatric problems of any sort at the time of admission to a treatment program. Of all persons presenting for admission listing stimulants as the drug of choice just over 5% complained of symptoms of a substance-induced disorder (4%), depressive disorder (0.7% of those reporting stimulants as the primary substance), bipolar disorder (0.4%), or anxiety disorder (0.2%). Unlike the data presented here, the SAMHSA data only had one third of individuals seeking treatment for substance abuse with one or more months of sobriety.

## LIMITATIONS

Care should be taken when interpreting the results of this study. This study was naturalistic in its design. Treatment

professionals at various treatment facilities gave a simplified version of some sections of the MINI and reported the results to the Consortium for analysis. Inter rater reliability was not measured. Attrition from all causes was moderate. The naturalistic design further had a limitation in that just under 25% (45 of 199) had follow-up times that were beyond the study period.

The MINI was abbreviated locally to the sections believed to be most commonly reported among methamphetamine abusers admitted for treatment and simplified to assess symptoms rather than disorders in order to minimize training requirements for the staff administering it. Since this version of the MINI has not been validated, we refer to symptom clusters or symptoms of disorders rather than particular diagnoses.

The subjects were also voluntary admissions to substance abuse treatment programs and therefore the results are restricted to those capable of giving informed consent for treatment. The study population is overwhelmingly Caucasian and is over one half female, which is reflective of the methamphetamine problem in the state of Iowa but may not be generalizable to other settings across the nation. Additionally, the participating facilities were not required to report psychiatric history, prior treatment with psychiatric medications, or referral for psychiatric treatment while in the substance abuse treatment facility. However, the use of psychiatric consultation and medication in these facilities is generally low and dually diagnosed patients are generally referred elsewhere. Given the involvement of law enforcement in almost one third of referrals (31%), compliance with treatment and maintenance of sobriety may have been enhanced by the probability of imminent consequences.

Future studies could be formulated using the MINI in its entirety and utilizing a traditional research design involving the administration of the MINI by mental health professionals not directly involved in the clinical assessment and care of the subject. Additionally the MINI could be completed across different treatment settings in various levels of care in order to increase the generalizability of these findings. Sobriety, employment, and lack of arrest could also be confirmed through external sources in addition to self-report rather than relying on self-reported data alone.

## CONCLUSION

The results of this study suggest that usual care is appropriate and effective for the treatment of individuals addicted to amphetamines regardless of the presence of symptoms of anxiety, abnormal mood, and/or antisocial personality traits. Although antisocial personality disorder was correlated with more diagnoses per person, there was no evidence to suggest that the diagnosis of antisocial personality disorder or legal involvement adversely affected

the treatment outcome. Although other studies have suggested that many amphetamine abusers with legal involvement were antisocial men who did not do well in treatment (12), this sample was predominantly female with one third having symptoms of antisocial personality who benefited from treatment (12,13). Other studies have demonstrated similar benefits suggesting that our findings may be representative (14–16).

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