Effectiveness of combined methadone maintenance treatment and psychosocial treatment program for heroin-dependent patients: an international experience

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Objective
To evaluate the effectiveness of combined methadone maintenance treatment and psychosocial treatment program for heroin-addicted patients.

Participants and methods
Forty-eight heroin-dependent participants were interviewed using the Addiction Severity Index (ASI), 5th ed., and the Mini International Neuropsychiatric Interview during the first week of their admission to a methadone clinic in Los Angeles, California, for baseline assessment. A follow-up ASI assessment was made 6 months after their first interview.

Results
ASI revealed that 67% of participants reported chronic medical problems, 69% were unemployed, 94% had been incarcerated, and 71% had suffered from psychiatric symptoms in the past 30 days, the most common being anxiety and depression. Female participants reported significantly more severe medical, employment, and psychiatric problems than did male participants. The Mini International Neuropsychiatric Interview revealed that 63% met criteria for the presence of one or more current psychiatric disorders. By the time of follow-up investigation, 15 participants had dropped out of the study. Participants who were still in treatment showed significant improvement in their medical, drug, legal, family, and psychiatric problems compared with their baseline assessments.

Conclusion
Combined methadone treatment and psychosocial treatment worked well for most of the participants of both sexes with or without comorbid psychiatric disorders.

Keywords:
addiction, heroin, methadone, psychosocial treatment, substance abuse

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Introduction

Substance use problems have been known to people since ancient times; however, only recently has attention been paid to the comorbidity of these problems with other psychiatric problems. Comorbid disorders are defined by the co-occurrence of substance use disorders (abuse or dependence) and other psychiatric disorders. In the USA, the prevalence of substance use disorders among people with a concurrent mental disorder was 29% compared with 16% in the general population. Among those with a lifetime alcohol use disorder (alcohol abuse or dependence), 37% had at least one other mental disorder and 22% had another drug use disorder. The highest levels of comorbidity were found for those with a lifetime history of any drug disorder other than alcohol, with 53% having comorbid mental disorders (Regier *et al.*, 1990).

One of the major problems with comorbidity is that one disorder may be overlooked while treating the other. In the USA, for example, out of 4.6 million adults with co-occurring substance use disorders and psychiatric disorders, only 6.0% received treatment for both mental health problems and substance use problems, 41.4% received treatment only for mental health problems, 5.0% received treatment only for substance use problems, and 47.5% received no treatment for either problem (National Survey on Drug Use and Health, 2004).

In 2000, heroin was the leading illicit drug among treatment admissions in the USA, accounting for 243 500 (15%) of the 1.6 million admissions in the Treatment Episode Data Set. It also accounted for 90% of Treatment Episode Data Set admissions with opiates as a primary substance of abuse [Office of Applied Studies, Substance Abuse and Mental Health Services Administration (SAMHSA), 2003].

Joseph *et al.* (2000) reported that methadone maintenance treatment (MMT) has been evaluated since its development in 1964. MMT reduces and/or eliminates the use of heroin, reduces the death rates and criminality associated with heroin use, and allows patients to improve

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their health and social productivity. In addition, MMT has the potential to reduce the transmission of infectious diseases associated with heroin injection, such as hepatitis and HIV. They added that the main effects of MMT are to relieve narcotic craving, suppress the abstinence syndrome, and block the euphoric effects associated with narcotic use.

Methods

This study was conducted at the Matrix Methadone Clinic in Los Angeles, California, which provides MMT together with psychosocial treatment for patients with opiate addiction. The clinic was established in 1991 to provide MMT for lower-income individuals with high levels of medical and psychosocial needs. The methadone dose given to patients was adjusted to control withdrawal symptoms and to prevent cravings. The dose for most patients was 80–120 mg/day. The psychosocial program combined elements of cognitive behavioral therapy, motivational interviewing, contingency management, and the 12-step approach. The counseling was delivered in group and individual sessions.

Forty-eight participants were interviewed in this study over a period of 10 months from April 2006 to February 2007, using the Addiction Severity Index (ASI), 5th ed., Lite version, and the Mini International Neuropsychiatric Interview (MINI) English version 5.0.0, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV). The interviews were carried out during the first week of the participants' admission to the clinic for baseline assessment. A second ASI interview was conducted with each participant 6 months after their first interview for follow-up assessment. During these 6 months, all participants were monitored for drug use through urine tests and breathalyzer tests while receiving their methadone and psychosocial treatment. Thirty-three participants completed the second ASI interview, and 15 dropped out of treatment before 6 months.

All new participants of both sexes and of all age categories who were admitted to the clinic consecutively between April 2006 and February 2007 were considered for the study if they were diagnosed with heroin dependence according to the DSM-IV criteria and if they were able to successfully complete the interviews. The primary drug problem for all participants was heroin, but many of them were also using other drugs or alcohol.

Participants were approached to participate in the study after they completed the intake process and after being administered the appropriate dose of methadone. To improve their cooperation and to ensure that reliable information could be obtained, the participants were interviewed when signs and symptoms of drug intoxication or withdrawal were minimal. After they were given clear and comprehensive information about the study, and after any questions they had about the study were answered, written consent was obtained from the participants to participate in the study and to release information from their medical records. After that, face-to-face ASI and MINI interviews were conducted for each participant.

All participants who were eligible for the study were asked to participate; 12 individuals refused for various reasons, including: (a) the relatively long time it takes to conduct the ASI and MINI interviews; (b) reluctance to release information from their medical records; and (c) anxiety about answering questions related to their legal problems, especially in those patients who were referred by the drug court, despite being reassured about the confidentiality of their information.

Urine testing was conducted once a month for each participant over the course of treatment. The days that urine samples were collected were selected randomly. All samples were analyzed for amphetamines, methamphetamines, cocaine, codeine, morphine, acetylmorphine, hydrocodone, methadone, methadone metabolites, benzodiazepines, and barbiturates.

The SPSS 15 (SPSS Inc., Chicago, Illinois, USA) software package was used for data analysis. Data were analyzed for descriptive statistics such as mean, SD, and percentages. Other analyses used were the independent sample *t*-test, the one-way analysis of variance, and the χ^2-test. A *P* value of 0.05 or less was considered statistically significant.

The addiction severity index

The ASI is a semistructured interview that takes 45–60 min to administer. It measures self-reported problems in seven major life domains: medical, employment/financial support, drug use, alcohol use, illegal activities, family/social relationships, and psychiatric problems. Items in each of these domains assess current functioning (i.e. past 30 days), lifetime issues, and client perceptions of their problems and their need for treatment or counseling. The clinical aim is to identify severity and treatment needs in each domain (Corse *et al.*, 1995; Butler *et al.*, 2001). The ASI gauges problem severity by calculating composite scores ranging from 0 (no problem) to 1 (extreme severity) in each of the seven domains.

The mini international neuropsychiatric interview

The MINI is a brief, structured diagnostic interview, developed in 1990 for detection of major DSM-IV and ICD-10 psychiatric disorders, with an administration time of approximately 15 min. It is the most widely used psychiatric structured diagnostic interview instrument in the world. It has acceptably high validation and reliability scores, and it has been validated against the much longer Structured Clinical Interview for DSM Disorders (SCID-P) in English and French and against the Composite International Diagnostic Interview for ICD-10 (CIDI) in English, French, and Arabic.

Results

First addiction severity index interview

Of the 48 participants in this study, 60% ($n = 29$) were male and 40% ($n = 19$) were female. Twenty-five percent

Table 1 Medical, legal, and family problems among the participants at baseline assessment

Variables	%
Lifetime hospitalization	83
Chronic medical problems (e.g. hypertension, diabetes mellitus, asthma)	67
Prescriptions for medical problems	56
Any medical problems (e.g. infections, pain)/past 30 days	58
Charges resulted in convictions	88
Disorderly conduct, vagrancy, public intoxication	23
Major driving violations	21
History of incarcerations	94
Physical abuse/lifetime	23
Sexual abuse/lifetime	23
Family conflicts/past 30 days	21
Conflicts with other people/past 30 days	27

($n = 12$) were white, 40% ($n = 19$) were African American, and 35% ($n = 17$) were Mexican American. The mean age of the participants was 49, and their ages ranged from 26 to 69 years.

In their lifetime, 83% of the participants reported that they had been hospitalized at least once for medical problems (mean = 4.54), 67% reported having one or more chronic medical problems (e.g. hypertension, diabetes, hepatitis, HIV), and 56% had been prescribed medications for these problems. In the past 30 days, 58% of the participants reported that they had suffered medical problems for at least 1 day (mean = 8.66) (Table 1).

The mean years of education of the participants was 12 (ranging from 8 to 14 years). In their lifetime, 83% of the participants reported that they had a full-time job, whereas in the past 3 years only 19% had full-time jobs and 69% were unemployed.

In the 30 days before presenting for treatment, only 25% of the participants reported that they were paid for working one or more days (mean = 3.52 days). Regarding their usual or last occupation, more than half of the participants reported working in skilled manual (29%) or semiskilled manual (27%) jobs.

Regarding drug/alcohol use in the past 30 days, 96% of the participants reported heroin use (one of those who was not using the drug was in a detoxification program and the other one was trying to stop on his own), 29% also reported cocaine use, 10% reported alcohol use to intoxication, 10% reported illicit methadone use, 8% reported cannabis use, 6% reported use of sedatives/hypnotics, 4% reported use of other opiates/analgesics, another 4% reported amphetamine use, and 38% reported use of more than one drug (including alcohol) per day. Ninety-four percent of the participants (mean = 21.75 days) had suffered from drug-related problems in the past 30 days. These problems included cravings, withdrawal symptoms, disturbing effects of use, or wanting to stop and being unable to do so.

When asked about their regular use of drugs and alcohol in their lifetime, all participants reported regular use of heroin (mean = 21 years). Cocaine was the most common secondary drug reported by 46% of the participants, and alcohol (use up to a state of intoxication) was the next most common secondary drug reported by 25% of the participants. Fifty-two percent of participants reported regular use of more than one drug (including alcohol) per day. The main route of administration was intravenous injection for heroin and cocaine, smoking for amphetamines and cannabis, and oral for other drugs/alcohol.

At the time of admission to the treatment program, 17% of the participants were referred to treatment by the criminal justice system (CJS), 31% were on parole or probation, and 8% were awaiting charges, trials, or sentences. Forty-four percent of the participants reported that they had engaged in illegal activities for profit, and 4% had been detained or incarcerated in the past 30 days.

In their lifetime, the majority of the participants (96%) had been charged with one or more illegal activities, and 94% of them had a history of incarceration (mean = 50.6 months in jail). The most commonly reported offenses were drug charges (77%), parole and/or probation violations (52%), and shoplifting and/or vandalism (46%). The majority of participants (88%) had been convicted on these charges (mean = 6.7 convictions) (Table 1).

In their lifetime, 23% of the participants reported that they had been physically abused and another 23% had been sexually abused; 19% of the participants who reported physical abuse also reported sexual abuse. In the past 30 days, 21% of the participants had serious conflicts with their families, and 27% had serious conflicts with other people (Table 1).

Regarding their psychiatric status, in their lifetime, 25% of the participants had a history of inpatient psychiatric treatments, and 50% had a history of outpatient psychiatric treatments. Seventy-one percent of participants had suffered from one or more psychiatric symptoms in the past 30 days, and 19% had been prescribed medications for these symptoms (Table 2).

In the past 30 days, anxiety symptoms were the most commonly reported psychiatric symptoms, with 65% of the participants reporting such symptoms. Depressive symptoms were the second most commonly reported symptoms (58%). Thirty-eight percent of participants reported troubles with memory and cognition, 17% reported hallucinations, 13% reported trouble controlling violent behaviors or episodes of rage, 10% reported thoughts of suicide, and 4% had attempted suicide (Table 2).

Table 2 Psychiatric symptoms and treatments among the participants at baseline assessment as measured by the Addiction Severity Index

Variables	Past 30 days (%)	Lifetime (%)
Serious depressive symptoms	58	73
Serious anxiety symptoms	65	65
Hallucinations	17	25
Troubles with memory and cognition	38	46
Trouble controlling violent behavior	13	23
Serious thoughts of suicide	10	27
Attempted suicide	4	21
Prescribed medication for any emotional problem	19	50

In their lifetime, the most commonly reported psychiatric symptoms were depression (73%), followed by anxiety (65%). Other reported symptoms included troubles with memory and cognition (46%), hallucinations (25%), suicidal thoughts (27%), suicidal attempts (21%), and trouble controlling violent behaviors or episodes of rage (23%) (Table 2).

Mini international neuropsychiatric interview results

Whereas the ASI provides information about psychiatric symptoms only, the MINI provides a psychiatric diagnosis. In this sample, the MINI assessment found that 63% of the participants had a current psychiatric disorder other than psychoactive substance use. At the time of the interview, depression, anxiety disorders, and antisocial personality disorder (ASPD) were the most commonly diagnosed psychiatric disorders among the participants. Thirty-five percent had current depression, 15% had social phobia, 13% had generalized anxiety disorder, 6% had panic disorder without agoraphobia and 2% had panic disorder with agoraphobia, and 4% had post-traumatic stress disorder. One-third of the participants had ASPD, and 29% had a current risk of suicide (Table 3).

Sex differences

As noted above, 60% of the participants were male and 40% were female. According to the ASI composite scores, female participants suffered significantly more severe medical, employment, and psychiatric problems than did male participants. No significant difference was found between the two groups with regard to drug and alcohol use problems, legal problems, or family and social problems (Table 4).

In the MINI, although not statistically significant for each disorder separately, we found that female patients suffered more psychiatric disorders than did male patients, except with regard to ASPD, which was slightly more often found among male patients than among female patients (35% male and 32% female). Overall, female patients had significantly more current psychiatric disorders than did male patients (79% female vs. 52% male). No significant differences were found between the two groups with regard to their lifetime history of any psychiatric disorder.

Table 3 Psychiatric disorders among the participants at baseline assessment as measured by the Mini International Neuropsychiatric Interview

Variables	%
Depression/current	35
Depression/recurrent	27
Current depression with melancholic features	10
Dysthymia/current	2
Suicidal risk	29
Hypomania/lifetime	2
Mania/lifetime	17
Panic disorder/current	
Without agoraphobia	6
With agoraphobia	2
Panic disorder/lifetime	15
Social phobia/current	15
PTSD	4
MD with psychotic features/current	13
MD with psychotic features/lifetime	13
Psychotic disorder/lifetime	4
GAD/current	13
ASPD	33
Current psychiatric disorders (no ASPD)	50
Current psychiatric disorders including ASPD	63
Any psychiatric disorder including ASPD/lifetime	67

ASDP, antisocial personality disorder; GAD, generalized anxiety disorder; MD, mood disorder; PTSD, post-traumatic stress disorder.

Table 4 Addiction Severity Index composite scores among male and female participants at baseline assessment

	Male ($N=29$)		Female ($N=19$)		
Variables	Mean	SD	Mean	SD	*P* value
Medical score	0.27	0.38	0.64	0.30	0.00
Employment score	0.78	0.24	0.93	0.12	0.01
Alcohol score	0.04	0.15	0.05	0.15	0.89
Drugs score	0.29	0.10	0.27	0.11	0.57
Legal score	0.15	0.20	0.16	0.25	0.80
Family score	0.16	0.19	0.15	0.21	0.79
Psychiatric score	0.24	0.25	0.45	0.24	0.00

The second (follow-up) addiction severity index interview

By the time the follow-up ASI interviews were conducted, 15 participants had dropped out of the treatment program; thus, only 33 participants were assessed at the follow-up. Of those who participated in the second interview, 54.5% ($n = 18$) were male and 45.5% ($n = 15$) were female. To determine how much progress the participants made in this 6-month period, the first (baseline) and second (follow-up) ASI interviews of the 33 participants who were still in treatment were compared.

The follow-up interviews revealed that the participants had made significant improvement in their medical, drug, legal, family, and psychiatric problems compared with their baseline assessment. Their alcohol and employment scores at follow-up did not change significantly (Table 5).

At follow-up, participants reported significantly fewer days of medical problems in the past 30 days (mean number of days was 1.9 vs. 9.6 at admission) and lower illegal income ($51.50 vs. $464.80) than at baseline assessment. In comparing the follow-up rates with baseline rates, the number of days of recent heroin use (1.21 vs. 24.75), the money spent on heroin ($16.96 vs. $808.18), the mean number of days of drug problems (5.27 vs. 22.12), and the percentage of those who were troubled by or needed additional treatment for their drug problems (42.4 vs. 93.9%) were all significantly lower.

Also at follow-up, the participants reported significantly fewer days of recent illegal activities, and none of the participants reported any arrests, charges, convictions, or incarcerations during the 6 months of treatment. Significantly, more participants were satisfied with their marital relationships at follow-up than at the baseline interview (85 vs. 61%).

As for psychiatric status, a significantly fewer number of participants reported current anxiety symptoms at follow-up than at baseline (46 vs. 76%). None of the participants had reported suicidal thoughts or attempts at follow-up, whereas 12.1 and 6.1% reported these problems in the baseline interview, respectively.

Table 5 Comparison of the Addiction Severity Index composite scores between the first and second baseline and follow-up Addiction Severity Index interviews

	First ASI interview ($N=33$)		Second ASI interview ($N=33$)		
Composite scores	Mean	SD	Mean	SD	*P* value
Medical score	0.47	0.39	0.10	0.22	0.00
Employment score	0.85	0.20	0.86	0.16	0.75
Alcohol score	0.07	0.17	0.02	0.07	0.20
Drugs score	0.29	0.20	0.12	0.07	0.00
Legal score	0.17	0.23	0.02	0.07	0.00
Family score	0.18	0.22	0.04	0.10	0.00
Psychiatric score	0.38	0.26	0.26	0.24	0.04

ASI, addiction severity index.

The mini international neuropsychiatric interview

Participants who had current psychiatric disorders at the baseline assessment made significant improvement in their medical, drug, legal, family, and psychiatric problems at follow-up compared with their baseline assessment. However, their psychiatric symptoms were more severe at the 6-month follow-up than for those who were not diagnosed with co-occurring psychiatric disorders.

Sex differences

After 6 months of treatment, female patients reported significantly more severe employment problems than did male patients. No significant differences were found among male and female patients regarding their medical, drug/alcohol, legal, family, or psychiatric problems.

Participants who dropped out

Of the 15 patients who dropped out of the study, 73% were male and 27% were female. As shown by the ASI composite scores, patients who were still in treatment had reported significantly more severe psychiatric problems at baseline assessment than did those who dropped out of the treatment program. There were no other significant differences between the two groups as revealed by their ASI domains or the MINI assessment.

Discussion

An important goal of this study was to gain experience and knowledge about the impact of MMT, combined with psychosocial treatment, when used with an older, medically and psychiatrically ill sample of heroin-addicted individuals. Further, the project provided an opportunity to demonstrate the utility of the MINI and ASI as measurement tools for assessing psychiatric comorbidity and problem severity in this population. Information from this study provided knowledge and experience to inform and enhance addiction treatment efforts in Assiut, Egypt.

The clinic that was used to recruit participants into MMT was populated by a much older, much sicker population than found in most treatment centers in the USA. The participants in this study (mean age 49.25 years) were much older than reported in many other studies. Sees *et al.* (2000) reported a mean age of 39.4 for patients seeking MMT, whereas Khalil *et al.* (2008) reported a mean age of 29 years for patients seeking addiction treatment that did not provide MMT. Heroin was the primary drug problem for all the participants, and they had used the drug for most of their productive lives (mean = 20.6 years of regular use). The most common secondary drug was cocaine (46%). This high rate of concurrent cocaine use has been previously reported in other samples (Schültz *et al.*, 1994; Frank and Galea, 1996).

When individuals have a long history of drug addiction, they are more likely to have problems with CJS, and this was the case with the participants in this study. The National Center on Addiction and Substance Abuse (1998) reported that, of the more than 1 million prisoners in federal institutions, over 60% had committed crimes that were connected with drug use. In the present study, the majority of the participants had been charged with illegal activities and had been incarcerated for a mean of 51 months. In reality, however, the mean is higher because the ASI only codes for up to 99 months of incarceration, and some participants reported more than 20 years in prison. Most of these charges were related to their drug use.

The participants reported a high rate of physical and sexual abuse, which could be a predisposing factor and a consequence and maintaining factor for their drug addiction, and it could be a very strong cause of relapse. Physical and sexual trauma is very difficult to deal with and such traumas could have been a powerful trigger for drug use for many participants who could not deal with them in a healthy way.

Comorbidity

Comorbidity of psychiatric disorders with addiction is common. This comorbidity could be a predisposing factor, a maintaining factor, a consequence of addiction, or a cause of relapse. The MINI found that 63% of the participants had a current psychiatric disorder, whereas the rate of those with current psychiatric symptoms as found by the ASI was 71%. Data from the ASI and the MINI revealed that the participants reported very high rates of previous psychiatric problems and treatments. All the participants who reported recent psychiatric problems also reported that they needed treatment for these problems, which is a sign that these individuals need help to manage their symptoms whether or not they are officially diagnosed with a psychiatric problem. Participants who had current psychiatric disorders at the baseline assessment still suffered from severe psychiatric problems at follow-up. This raises the need for more collaboration between drug treatment programs and psychiatrists and psychotherapists to improve patients' psychiatric status and substance abuse treatment outcomes.

Follow-up

In this study, more than two-thirds (69%) of the participants were still in treatment at the 6-month follow-up period. Although this is considered a high retention rate for a MMT program, it is troubling that 31% of these seriously ill patients discontinued treatment prematurely. Brands and Brands (1998) reported that MMT had higher retention rates (68% after 3 months) compared with outpatient counseling without methadone (36%) or residential programs without methadone (45%). Although we did not precisely track when the participants dropped out of the clinic, some studies reported that dropouts tended to occur early in treatment. Simpson *et al.* (1997) found that new admissions were more likely to dropout within the first 3 months of methadone treatment and that about 50% of the admissions had dropped out within 12 months.

The participants had made significant progress in their road to recovery on all of the ASI domains except for the alcohol and employment domains; the latter even became worse at follow-up. Patients who were abusing alcohol (10.4% in the past 30 days) had also made progress in reducing their alcohol use, but this progress was statistically insignificant. Because it takes more time and more rehabilitation to improve the employment situation, it is difficult to look for progress in this domain within that 6-month period of follow-up. In addition to their low educational level, almost all our patients had a long history of troubles with CJS, which has a major impact on their credit history, and accordingly their chances to compete for a job become a more challenging task.

Sex differences

Although female participants came to treatment with significantly more severe medical, employment, and psychiatric problems than did male participants, at follow-up both male and female participants had achieved significant progress in their road to recovery except with regard to medical status; female participants were still suffering significantly more severe medical problems than were male participants.

Dropout cases

During the 6-month period of treatment, about one-third of the participants, most of them male, dropped out of the study. Participants who were still in treatment by the time of the follow-up interview reported significantly more severe psychiatric symptoms on the first ASI interview than did those who dropped out. Also, in general, although not statistically significant, participants who were still in treatment reported more severe symptoms in all domains of the ASI and more psychiatric disorders in the MINI than did those who dropped out.

It has been reported that high severity of addiction is associated with both the best and the worst long-term outcomes. Unlike with most medical disorders, the severity of addiction can facilitate a favorable prognosis (Graham *et al.*, 2003). This means that patients with more severe addiction problems may do better in treatment than those with less severe problems, who may be at an early stage in their recovery (i.e. not yet ready for total abstinence).

The limitation of this study was that because of limited financial support and time constraints the sample size was small and the study duration brief.

Conclusion

This study has shown that the combination of MMT and psychosocial treatment worked well for most of the participants of both sexes. This is particularly promising as the study sample comprised older participants who were chronic substance abusers. We recommend applying this treatment program for opiate-addicted patients, especially older, severely addicted individuals, at the addiction treatment center in Assiut University Hospital and in other treatment centers in Egypt. More research is needed to evaluate the effectiveness of this treatment program for patients with substance use problems in Egypt.

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Conflicts of interest

There are no conflicts of interest.

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