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Predictors of retention in methadone maintenance therapy: A prospective multi-center study

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In the methadone maintenance therapy (MMT) as the treatment of choice in opiate dependency, retention is considered as a target. Given the paucity of data regarding factors affecting retention in MMT in Iran, we sought to determine the predictors of duration of retention. This multi-center prospective study was conducted at 7 outpatient treatment facilities in 4 cities in Iran, in 2007. 282 consecutive opiate dependent people were followed for 6 months, following their entry to MMT. Independent data were registered at baseline and included socio-demographic, social, psychological, drug related and legal data. Length of retention in MMT (0 - 6) considered as dependent variable. Predictors of length of retention were determined using a backward linear regression model. Retention was 0 months in 17.7% (n = 50), 1 months in 19.8% (n = 56), 2 months in 9.2% (n = 26), 3 months in 3.5% (n = 10), 4 months in 8.2% (n = 23), 5 months in 18.8% (n = 53) and 6 months in 22.7% (n = 64). According to the backward linear regression, the only predictors of remission were city (B=0.427, p < 0.001, CI = 0.339 - 0.514), perceived importance of distance to clinic (B = -0.008, p = 0.085, CI = -0.018 - 0.001), perceived social support (B = 0.006, p = 0.069, CI = 0.000 - 0.013), and perceived pleasure with drug use (B = 0.010, p = 0.007, CI = 0.003 - 0.017). This study shed light on factors that may serve as barriers for remaining in MMT for opiate dependence, in Iran. Some variables should be considered in programs developed by Iranian authorities to increase retention rate in MMT.

Key words: Treatment retention, drug use, opiate, methadone maintenance.

INTRODUCTION

Iran is a country with 70,000,000 populations, which are mostly young. About 2,000,000 Iranians abuse drugs, with the main drug of abuse opiates (Yassami et al., 2002; Razzaghi et al., 2006). Iran's geographical position contributes substantially to the availability of opium within its extensive borders, because, 75% of Afghanistan's total opiate exports are shipped abroad via Iran/ Pakistan to Europe (World drug report, 2005). In Iran, similar to several other countries in the world, the treatment of choice for opiates dependence is methadone maintenance therapy (MMT). There are currently 1,400 MMT centers in Iran. The latest national statistics show that

115,000 people have received methadone therapy (Mokri, 2008).

MMT has proved its efficacy (Mattick et al., 2002). MMT not only reduces the illicit opioid abuse itself but also lessens opioid use-associated social problems such as drug-related criminal and violent behaviors (Mokri and Vazirian, 2005). A consistent, statistically significant relationship between MMT and the reduction of illicit opiate use, HIV risk behaviors and drug and property-related criminal behaviors. The effectiveness of MMT is most apparent in its ability to reduce drug-related criminal behaviors. According to meta-analyses, MMT has shown effect on reducing illicit opiate use and drug and property-related criminal behaviors, and reducing HIV risk behaviors (Marsch, 1998). Longer treatment retention is associated with better treatment outcomes (Hser et al.,

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2004; Fareed et al., 2009; Gowing et al., 2006). Some believe that retention can be considered as a measure of drug treatment effectiveness (Beynon et al., 2008). Unfortunately, currently in most MMT programs in the world, retention rate is suboptimal (Amodeo et al., 2008). Poor MMT retention means that a considerable proportion of clients terminate therapy prior to receiving therapeutic benefit (Katz et al., 2004). This has been reported to be associated with different variables, in different parts of the world. Socio-demographics include age (Vendetti et al., 2002; Mateyoke-Scriver et al., 2004; Vaughn et al., 2002; Magura et al., 1998), gender (Vaughn et al., 2002), marital status, employment (Vendetti et al., 2002; Mateyoke-Scriver et al., 2004), education, ethnicity (Vendetti et al., 2002; Wang et al., 2007) and rural/urban origin (Vaughn et al., 2002). Another set is mental health either psychological status (Amodeo et al., 2008) or psychiatric disorders history (Lang and Belenko, 2000) and also past suicide attempts (Steer, 1980). Socio-legal data such as social support (Vaughn et al., 2002), living in institutions prior to program entry (Amodeo et al., 2008), criminal activity (Mateyoke-Scriver et al., 2004; Magura et al., 1998), juvenile incarceration (Mateyoke-Scriver et al., 2004), social conformity and social network, drug dealing income, unprotected sex, problems with others, experience gunshot or stabbing (Lang and Belenko, 2000) are another list. Another set, namely drug related data includes drug of abuse (Mateyoke-Scriver et al., 2004; Lang and Belenko, 2000), time of last drugs use (Wang et al., 2007), duration of drug dependence (Wang et al., 2007; Villano et al., 2002), self-perceived dependence on drug (Vendetti et al., 2002). The last main category is related to delivery of care and includes distance traveled to treatment (Beardsley et al., 2003), place of referral (Vaughn et al., 2002; Beynon et al., 2008), type of service (Booth et al., 2004), motivation for treatment (Steer, 1980) and dose (Wang et al., 2007; Booth et al., 2004).

Unfortunately, little research has been carried out in Iran, with a high rate of opiate dependency (Yassami et al., 2002). We herein determined independent predictors of duration of retention in MMT from a wide range of socio-demographic, psychological, social and legal and also drug related data.

METHODS

This multi-center prospective study was conducted at 7 outpatient treatment facilities in 4 cities in Iran, in 2007, 282 consecutive opiate dependent people were followed for 6 months, following their entry to MMT.

Patients

All patients were select after a complete physical and psychiatric evaluation. Criteria for Opioid Dependence in this study was presence of at least three of the following symptoms must occur during a 12 month period: 1) Tolerance, 2) Withdrawal, 3) Opioid

use in greater quantities or for longer periods of time than planned, 4) Failed attempts to quit or cut back (at minimum, a wish to cut back), 5) Considerable time devoted to obtaining drug, using drug or recovering from use of drug, 6) Interference with social, occupational or recreational activities, and 7) Ongoing use despite awareness of drug problem (American Psychiatric Association, 1994).

We included our patients according to the principles of medical management of methadone patients. Patients were included to MMT if they had a minimum age of 18 years, and met the criteria for opioid dependence. Exclusion criteria included using any drug/medication that potentate's methadone dose or induces withdrawal. Although patients underwent serial tests for detoxification, this data was not included in this study. Before MMT, adjusting of the dosage of methadone was done, according to needs of each patient.

Data collection

Independent data were registered at baseline during an interview. The interviews were carried out by university graduates (MS, BS) with drug abuse related majors/degrees who were dispatched to the provinces after being trained through workshops in Tehran (the capital of Islamic Republic of Iran). Each interview took less than 90 min. During data collection, self reported data were collected using paper-based checklists.

Independents variables

In this study, we registered 120 independent variables in a checklist, which was designed by the research team. Although all 120 variables have not been listed here, independents data were selected from a comprehensive literature review of retention associated variables. These include the following categories: A) sociodemographic variables namely age (Vendetti et al., 2002; Wang et al., 2007; Beynon et al., 2008), marital status (Vendetti et al., 2002; Wang et al., 2007), employment (Vendetti et al., 2002; Wang et al., 2007), education, ethnicity (Vendetti et al., 2002; Magura et al., 1998) and rural/urban origin (Beynon et al., 2008). B) Social data namely social support (Beynon et al., 2008), living place prior to program entry (Mateyoke-Scriver et al., 2004), social networks (Friedmann et al., 2001), C) Diagnosed psychiatric history (Friedmann et al., 2001), D) legal data (Friedmann et al., 2001) such as criminal activity (Wang et al., 2007), history of incarceration (Wang et al., 2007). E) Drug related data such as recent use of drugs (Magura et al., 1998), duration of drug dependence (Magura et al., 1998), dominant drug (Wang et al., 2001), polydrug use, (Vendetti et al., 2002). F) Treatment characteristics such as approximate distance traveled to treatment (Villano et al., 2002), place of referral (Beynon et al., 2008), city of treatment (Vaughn et al., 2002).

Dependent variable

Length of retention in MMT (0 - 6) considered as dependent variable (main outcome).

Methadone dosing and maintenance

No any other interventions such as involvement in Narcotics Anonymous were done. Patients did not receive any investigation for infectious diseases. Unfortunately, methadone dose (Magura et al., 1998; Lang and Belenko, 2000), charges and type of service, desire and motivation for treatment (Lang and Belenko, 2000) and also psychological status (Mateyoke-Scriver et al., 2004) were not

Table 1. Baseline data in study population.

Diagnosed condition		
somatic disorder	111	39.4
psychiatric disorder	52	18.4
Living place		
Own house	257	91.1
Birth place		
Center of district	138	48.9
A city in district	115	40.8
Rural area	27	9.6
Educational level		
No literacy	11	3.9
Read and write	11	3.9
Primary school	34	12.1
Guidance school	97	34.4
Secondary school	29	10.3
Diploma	67	23.8
Technical assistance	10	3.5
Bachelor or higher degrees	13	4.6
Ethnicity		
Tork	84	29.8
Lor	4	1.4
Fars	111	39.4
Kord	78	27.7
Lak	3	1.1
Arab	2	0.7
City		
Shiraz	33	11.7
Ilam	84	29.8
Ardebil	81	28.7
Semnan	84	29.8

assessed in this analysis.

Statistical analysis

The data analyses were preformed using SPSS for Windows 13. Predictors of length of retention were determined using a backward linear regression model. We only entered those independent variables that were significantly associated with the length of retention in univariate analysis to our regression analysis. P-value less than 0.05 was considered significant.

RESULTS

Study population

All patients were male, most had Fars ethnicity, were

resident of urban places, and had some literacy (Table 1).

The most prevalent used drug at the time of study was opium, followed by purified (crystal) heroin and routine (powder) heroin. (Table 2)

Retention

Retention was 1 month in 37.6%, 2 months in 9.2%, 3 months in 3.5%, 4 months in 8.2%, 5 months in 18.8% and 6 months in 22.7%.

Predictors of retention

Backward linear regression showed that remission was predicted by city ($B = 0.427$, $p < 0.001$, $CI = 0.339 - 0.514$), percentage importance of distance ($B = -0.008$, $p = 0.085$, $CI = -0.018 - 0.001$), percentage perceived social support ($B = 0.006$, $p = 0.069$, $CI = 0.000-0.013$), percentage joy with use ($B = 0.010$, $p = 0.007$, $CI = 0.003 - 0.017$). Neither of other socio-demographic data, drug related data nor psychological data did not remain in the model (Table 3).

DISCUSSION

According to our study, from a long list of baseline socio-demographic, psychological, legal, and drug related variables, those which could predict retention in MMT include: city, perceived importance of distance, perceived social support and perceived pleasure with drugs use.

According to our study, the 90 day-retention rate was 50%, which is about previous reported rates of the literature (Wang et al., 2007; Booth et al., 2004). One study reported a monthly drop out rate of 30% (Wang et al., 2007). Ethnicity is an important determinant of retention (Vendetti et al., 2002). In comparison to some other ethnicities, lower retention is reported in Asians (Beynon et al., 2008).

In our study, the city was as an independent determinant of retention of patients in MMT. In a study conducted between 2005 and 2006 in North West of England, according to regression, drop out was more likely to happen among residents of some cities than others (Beynon et al., 2008). This might be explained through service characteristics, and the quality of MMT services (Booth et al., 2004).

Other three retention predictors in our study – namely perceived importance of distance, perceived social support and joy with use - were client characteristics. Client characteristics are known as important factors in retention in addiction treatment services (Vaughn et al., 2002).

In our study, perceived importance of distance of treatment place was a predictor of MMT retention. A study of

Table 2. Pattern of use of drugs in study population.

Opium	n	%
Lifetime	266	94.3
Current	109	38.7
Dominant	115	40.8
Shireh (opium juice)		
Lifetime	148	52.5
Current	39	13.8
Dominant	25	8.9
Sookhteh (opium residue)		
Lifetime	71	25.2
Current	6	2.1
Dominant	1	0.4
Heroin		
Lifetime	99	35.1
Current	50	17.7
Dominant	43	15.2
Purified Heroin (Kerack)		
Lifetime	134	47.5
Current	107	37.9
Dominant	102	36.2
Norjesik		
Lifetime	23	8.2
Current	12	4.3
Dominant	10	3.5
Cannabis		
Lifetime	98	34.8
Current	9	3.2
Dominant	0	0
Amphetamines		
Lifetime	18	6.4
Current	3	1.1
Dominant	0	0
Ecstasy		
Lifetime	11	3.9
Current	1	0.4
Dominant	0	0
Cocaine		
Lifetime	9	3.2
Current	2	0.7
Dominant	0	0
LSD		
Lifetime	2	0.7
Current	0	0

Table 2. Continued.

Dominant	0	0
Alcohol		
Lifetime	109	38.7
Current	3	1.1
Dominant	0	0

Table 3. Predictors of retention in MMT.

	Unstandardized coefficients B	Sig.	95% Confidence interval for B	
			Lower bound	Upper bound
city	0.427	<0.001	0.339	0.514
perceived importance of distance	-0.008	0.085	-0.018	0.001
perceived social support	0.006	0.069	<0.001	0.013
perceived joy with drug use	0.010	0.007	0.003	0.017

1,735 clients attending outpatient treatment in an urban area showed that clients who traveled less than 1 mile were 50% more likely to complete treatment than clients who traveled more than 1 mile, and clients who traveled more than 4 miles were significantly more likely to have a shorter length of stay than clients who traveled less than 1 mile. This effect remained significantly independent of demographic variables and type of drug problem. These findings have important implications for the geographic placement of new MMT facilities, as well as the provision of transportation services to maximize treatment retention (Beardsley et al., 2003). According to a clinical trial, facilitation of transport to MMT centers by provision of transportation services improved retention, however individual vouchers or payment for public transportation did not (Friedmann et al., 2001).

Regarding the impact of perceived social support on retention, research has shown that having significant others might have a higher retention rate (Vaughn et al., 2002). Social conformity and having close friends has been listed as factors associated with retention duration (Lang and Belenko, 2000). Similar results have been reported for the institutionalized patients (Amodeo et al., 2008).

Longer treatment retention is associated with several benefits not only such as greater service intensity and satisfaction, but also favorable treatment outcomes (Hser et al., 2004). Although some believe that retention is the best available measure of drug treatment effectiveness (Beynon et al., 2008), unfortunately, across most MMT programs in the world, retention rate varies from low to moderate. By other means, in most settings, MMT retention is suboptimal (Amodeo et al., 2008).

Determination of barriers for retention might have implications both for clinical practices and policy making. Considering non-modifiable risk factors of shorter

retention, clinicians should target some clients with special baseline characteristics more proactively to encourage subsequent attendance (Vendetti et al., 2002). Policy makers and health care providers should consider modifiable risk factors of low retention in their strategies aiming to improve MMT retention (Beynon et al., 2008).

To increase retention rate, providing individual counseling (Wang et al., 2007), individual role induction sessions (Katz et al., 2004), using more appropriate doses (Wang et al., 2007; Booth et al., 2004), providing free treatment, and greater contacts with the clinic (Booth et al., 2004) or provision transportation (Friedmann et al., 2001) may be effective.

To compare the results of the current investigation with other studies, we should be reminded that different studies have assessed in different settings (Booth et al., 2004; Amodeo et al., 2008; Lang and Belenko, 2000; Wang et al., 2007; Mateyoke-Scriver et al., 2004; Friedmann et al., 2001) and in patients using different drugs (Vendetti et al., 2002; Wang et al., 2007; Villano et al., 2002). We should know that associates of retention in a certain program may not be generalizable across common treatment modalities, and is only appropriate of the specific programs which were studied (Steer, 1980). Also the definition of drop out in different investigations are different, not only by means of definition (Vendetti et al., 2002), but also length of retention (Beynon et al., 2008; Booth et al., 2004; Friedmann et al., 2001), or cut point (Magura et al., 1998).

Lack of survival analysis is a weakness of this study. A more precise measure of the dependent variable would involve the number of days rather than the number of months in methadone maintenance treatment, as well. To list our other limitations, we did not assess in-treatment variables and we did not use standardized questionnaires. However some other studies have also neglected

these variables, these variables have great impact on retention (Magura et al., 1998). Small sample size and maximum 6 months follow up were other limitations of the current investigation.

To conclude, this study informs Iranian policy makers and clinicians about some modifiable and non-modifiable risk factors of low MMT retention. According to this study, some variables of MMT / patients should be focused if increasing the remaining in MMT of opiate dependent people is aimed.

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