

Chapter 3: Paper 2

Factors associated with treatment outcomes at the National Rehabilitation Center (NRC) in Abu Dhabi (UAE)

Abstract

Data extracted from case notes of all NRC patients from February 2002 to August 2011 were analyzed to obtain a descriptive profile and changes in trends during this period. The data were extracted manually with a template and entered into a spreadsheet for analysis. During the period under consideration, only male patients were admitted to the NRC. Data on 591 patients were included in the study. The profiles of the patients are reported elsewhere (Chapter 2). This chapter focuses on the factors associated with treatment outcomes of the NRC patients analyzed according to the most common factors found in the international literature. The study analyzed the data for factors associated with outcome according to seven hypotheses based on the literature.

Relapse rates differed according to the primary substance of abuse. The highest proportion relapsing was among patients admitted for alcohol abuse at 44%, the second highest was for heroin abuse at 20%, poly-substance use at 13% and marijuana use at 10%. A cross tabulation and chi-square test was performed; statistically significant relationships with treatment outcomes were found only between employment status and admission year. Mood disorders were nearly significant and main drug of abuse was weakly significant concerning good treatment outcome.

A recommendation from this study is to have in place an instrument such as the ASI (Addiction Severity Index) that would collect data on admission, at discharge and at the intervals after discharge, by following up patients longitudinally.

Introduction

Substance misuse treatment and rehabilitation has a long history and involves a wide range of treatments and approaches. They can be broadly categorized into medical treatment and psychosocial approaches. The current model of substance misuse treatment is described as the Bio-psychosocial-spiritual model (Engel, 1980, Miller, 1998). This comprehensive model as the name suggests incorporates medical treatment (chemical and physical) for the biological component, which includes detoxification, psychological therapies including family work and social interventions. The spiritual component brings in religious and cultural context as well as elements of the 12-steps approach (Miller, 1998). Treatment evaluation research has produced evidence for the efficacy of different treatments (Miller and Moyers, 2014). Today treatment centers are expected to provide “evidence based” treatments. Treatment centers around the world provide this evidence based treatment although much of the research for the effectiveness of treatment has come from the USA and Western countries (West, 2013). Much of the research on factors associated with good treatment outcomes also comes from the same countries. There is little or no research data on treatment outcome or factors associated with good outcome from treatment centers in the Middle East. Analysis of the 10-year data from the NRC to study the factors associated with good outcomes and to explore whether the known factors in the literature.

The National Rehabilitation Centre (NRC) in Abu Dhabi is the primary rehabilitation facility that recruits UAE nationals from all seven emirates. The NRC provides pharmacotherapy, rehabilitation programs and long-term treatment management plans that are customized to the needs of patients.

The NRC treatment program consists of an assessment phase, a detoxification phase for those who require it, and a rehabilitation phase that involves evidence-based psychosocial interventions and culturally relevant spiritual approaches. Whilst always based on evidence-based approaches, like in any treatment setting, this treatment program evolved over the 10-year period. Elarabi et al (2014) describe the process of program development at the NRC to arrive at the current treatment program. Since the program has not remained constant, the outcomes cannot be regarded as due to a particular program but the treatment at the NRC as a whole.

The center also plays a role in disseminating educational material relating to a range of community oriented preventative programs. These programs target family units, children at schools, and the workplace and are promoted at general public spaces in order to instill an understanding in the community of the dangers of substance use disorder as well as to introduce the available support and care in the NRC.

Outcome measurement in substance use is a relatively new field of study. Historically there were only two outcomes of treatment, abstinence or relapse. Traditionally a single incident of use following treatment is considered a relapse. Relapse following treatment is seen as the main outcome of addiction treatment (Gossop et al., 1989). A number of researchers who argued that treatment outcomes could be more complex and much broader (McLellan, et al., 1980) challenged this view. The Addiction Severity Index or ASI (McLellan, et al., 1980) is an example of outcome measurement instrument that takes a broader view. The literature also shows that researchers are

moving away from the traditional abstinence – relapse outcome measurement in different studies often focus on different outcomes with no standard agreement. To give a few examples, studies have focused on: mortality, drug use, abstinence and intentions (Gossop et al., 1989); mortality, use of services, needle sharing, HIV status, employment and marital status (Skidmore et al., 1990) and use of services, abstinence, drug use, illegal behavior, employment status and client satisfaction (McAuliffe, 1990). Because of the diversity of outcome criteria, researchers moved towards measuring outcome in terms of composite domains. The ASI (McLellan et al., 1980) was the first instrument to use domains. It used seven outcome domains including drug use, alcohol use, medical problems, employment support/support status, legal problems, interpersonal problems (family and social relationships) and psychological problems. Another instrument, the Opiate Treatment Index (OTI) (Dark et al., 1991), had six domains, namely, drug use, HIV risk taking behavior, social functioning, criminality, health status and psychological adjustment. The Maudsley Addiction Profile (MAP) (Marsden et al., 1998) is the most recent composite instrument with six domains: substance use, health risk behavior, health status, psychological status, personal and social functioning and criminal behavior.

The administration of the above instruments takes time and it is difficult to use them in busy clinical settings. They are mostly used in research studies. In clinical settings, outcomes such as retention in treatment and treatment completion are commonly used. To measure outcomes systematically, standardized instruments such as the ASI or the MAP have to be administered at assessment and repeated at the end of treatment and at defined follow-up periods. Linked to outcome measurement, researchers have studied factors that are associated with good and undesirable outcomes. Some common factors have emerged as associated with better outcomes.

Early initiation of drug use, which contributes to the length of period of drug use (or duration), has been found to be associated with poorer outcomes. Generally, early initiation of drug use is associated with longer periods of drug use. Early initiation of drug use is also associated with factors such as childhood abuse, neglect, household dysfunction and parental drug use (Dube et al., 2003). An adverse childhood experience has been found to contribute to a 2-4-fold increase in likelihood of early initiation of drug use (Dube et al., 2003). In a study published in August in 2014, initiating cocaine use at a very young age is associated with persistent psychosocial problems in treatment-seeking cocaine users and overall poor response to treatment (Weiss and Petry, 2014). These findings point to the fact that early initiation of drug use is indicative of complex histories that would lead to greater severity of dependence that is associated with poorer outcome of treatment (Miller and Moyers, 2014).

Higher level of education has also been linked to better outcomes. Studies found that low literacy is associated with relapse to addiction (Xie and McHugo, 2005). A number of factors could explain this. One possibility is that higher level of education may indicate later initiation of drug use as early initiation of drug use may disrupt an individual's education. Higher level of education could also mean that the individual could benefit more from the treatment program. It could also mean that the individual has more resources to deal with the problem of drug use.

Outcome literature also shows that marital status is associated with treatment outcome. Studies show that married individuals or individuals in a stable relationship tends to show better outcome than the single or divorced (e.g., Sharif, 2011). Extra support, care, and closer monitoring are possible explanations of these findings.

Literature also shows that employed individuals have better outcomes and unemployment was one of the main factors associated with relapse or poorer outcomes (Moos and Moos, 2006). This again could indicate that the individual has more resources. Employment also gives structure and purpose to the life of the individual. Employment before coming into treatment could add further motivation for recovery.

Mental health problems have been associated with poorer outcomes (Rounsaville et al., 1987). There are a number of studies that show mental health problems are associated with poorer outcomes in substance use treatment (Rounsaville et al., 1987; Marsden et al., 2000; Grella et al., 2001; Compton et al., 2003).

Family history of substance abuse has also been associated with poor outcomes (Pickens et al., 2001; Adamson et al., 2009). However, some studies have also shown that family history was not associated with treatment outcome (e.g., Coviello et al., 2004).

The association of co-existence of psychiatric disorders and poor outcomes in addiction treatment has been known for some time (McLellan et al., 1983). Studies have consistently shown poor treatment outcomes to be associated with co-morbid disorders such as anxiety, mood disorders and psychosis (Drake et al., 1996; Compton et al., 2003).

Studies have identified many other factors to be associated with good outcome in substance abuse treatment. These include readiness to change (recognition of problem, resolving ambivalence and taking action), self-efficacy, expectation about therapy outcome, satisfaction of treatment, perceived social support, positive emotional states, and the realization of meaning of life (Flora and Stalikas, 2013).

Generalizable (common) and non-generalizable situational factors (High Risk Situations) have been identified to be associated with poor treatment outcome or relapse (Marlatt and Gordon, 1985; Ducray, 2012).

Present study

The present study involves the analysis of data collected over a 10-year period at the NRC. For the purpose of the study, “*good outcome*” is considered one of the following:

- a) Treatment completion and discharge to home, or
- b) Transfer to outpatient clinic.

The “*bad outcomes*” refer to:

- a) disciplinary discharge, discharge against medical advice, or
- b) return to jail in case of involuntary patients, or
- c) Readmission because of relapse (first relapse)

The data set used in this study was constructed by extracting data from case notes not by use of standardized instruments. Data on changes in the different domains of outcome was not systematically recorded. Data on treatment completion, attendance at outpatient clinic, discharge against medical advice, disciplinary discharge and relapse were available. Treatment completion and attendance at outpatient clinic was used as a good outcome in the data analysis.

Based on the literature and data availability, hypotheses were generated to examine the relationship between treatment outcomes and demographic characteristics of age, higher level of education, marital status, employment, family history, mental health problems, and main drug of use. It is anticipated that associations similar to those in the existing literature will be seen (i.e., younger

age at first admission, divorce, a history of mental illness (anxiety, mood and psychiatric illness) and type of drug are each associated with poor outcomes of treatment). On the other hand, higher level of education and being employed will be related to good treatment outcome.

Methods

Study population

All 591 patients who visited the NRC for treatment from substance or alcohol use during the period February 2002 to August 2011 were included in the study. The NRC accepts for treatment only UAE nationals. Although nationals from all seven of the UAE Emirates are eligible for treatment at the NRC, most of the patients actually come from the Emirate of Abu Dhabi where the Centre is located. All patients treated at the Centre during the study period were male, as there were no facilities at the center to accommodate females at that time.

Sources of data

The data used in this study was constructed by extracting data from case notes, not by use of standardized instruments. Data on changes in the different domains of outcome was not systemically recorded. Data on treatment completion, attendance at the outpatient clinic, and discharge against medical advice, disciplinary discharge and relapse were available. Treatment completion and attendance at outpatient clinic was used as a good outcome in the data analysis.

All data for this analysis were obtained from the medical records of patients. A team of data collectors from the NRC and the University of UAE, Al Ain, Abu Dhabi, was trained to abstract the medical records using a data form prepared specifically for the purpose of this study. Senior researchers prepared the data extraction form from the NRC and the departments of public health

and psychiatry at the University. Data collectors were students from the medical school and researchers from NRC. Data collection was carried out under strict confidentiality and personal identifying information was not collected. This effort was carried out as a joint project between the NRC and the UAE University. The data covered patient records for the period February 2002 to August 2011.

Every effort was made to obtain high quality data despite the difficulty of abstracting medical records that were not originally prepared for the purpose of research. This was carried out through careful planning for the study and sufficient training for the data collection team.

Data analysis:

The aim of the study is to explore factors associated with treatment outcome in the study population. The study is a clinical case series of substance abusers admitted to the National Rehabilitation Center (NRC), Abu Dhabi.

Table (1): List of all Dependent and Independent variables for NRC patients. Abu Dhabi, UAE (2002-2011) ($n=591$)

Variable category	Variable name	Variable type	Variable definition
1-Socio-demographic variables:	Age	Continuous and categorical, Independent variable	Age was initially collected as a continuous variable and can be categorized in different ways during data analysis. Proposed categories: <20years, 20-29, 30-39, ≥ 40 Reference category is ≥ 40
	Education	Categorical	Categories include: Illiterate, primary education (1-6 years of formal education), preparatory and secondary education (7-12 years of formal education), and higher education (> 12 years of formal education) Reference category is >12 years of education

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	Marital status	Categorical	Categories include: Married, single, divorced, widowed, and separated Reference category is married.
	Place of residence in UAE	Categorical (nominal)	Abu Dhabi City, Al Ain, Dubai, Ajman, Sharjah, RAK, Fujairah, Umm- Al Qawain , ABD-Western region, others
	Employment	Categorical	Employed/student, Unemployed, Retired Reference category is retired
2-Substance use variables:	Age at first admission:		Continuous and may be categorized as <20, 20-39, and ≥ 40 years Reference category is ≥40
	Circumstances at initiation: For example, family problems, unemployment, divorce, etc.		Categorical
	Type of substance abused: Alcohol, heroin, cocaine, stimulants, medications, etc.		Categorical
	Method of intake: Snorting, injection, smoking, ingestion, etc.		Categorical
	Setting of initiation: Peers, family members, etc		Categorical: Years 2002, 2003, ...2011
	Setting of initiation: Peers, family members, etc.		Categorical: <3 years, 3-6, and >6
	Year of seeking treatment at the NRC: Substance use pattern over yearly time periods will be explored.		Reference category is <3
	Years since treatment started		Categorical
	Consequences of abuse: Loss of employment, divorce, imprisonment, etc		Categorical
	Family history of drug use		Binary
	Admission status (voluntary vs. involuntary)		Binary
3-Medical	Presence of infectious diseases mainly hepatitis B and C (HIV is an exclusion diagnosis)		Binary: hepatitis B (yes/no), and hepatitis C (yes/no)
	Outcome of treatment: Complete abstinence, maintenance therapy, referral, etc		Categorical
	Relapses		Binary: (yes/no)

All the variables listed in table (1), will be treated as descriptive variables of substance abusers admitted to the NRC during the study period. Outcome of treatment and relapse will also be treated as dependent variables and their association with age and education (as independent variables) will

be examined. To control for potential confounding, multivariable logistic regression analyses were performed. Potential confounding variables are used as independent variables and their relationships to treatment outcome and relapse are ascertained in bivariate analyses as well as in multivariable regression models. The data were entered and analyzed using the statistical software package (SPSS) version 23.

Model selection

Choosing the “best” regression model is as much a science as it is an art. For answering the research questions of interest, we want to include the variables that we are specifically testing along with other variables that affect the response in order to avoid biased results.

Outcome of treatment will be further dichotomized (good/bad) and used as a dependent variable in a Multivariable logistic regression analysis to identify the factors independently related to this variable after controlling for all other variables. This analysis will be repeated in order to find the most parsimonious model that best fits the data. To elaborate more on using multivariable logistic regression for testing the hypothesis regarding the association between “good/bad treatment outcome” and “early age at first admission” as an example, the following logistic regression model is explained:

$$Y = \alpha + b_1x_1 + b_2x_2 + \dots + b_nx_n$$

Y is the ln (odds) of the binary outcome of interest or dependent variable, x_1 is “age of initiation of substance use (early/late) as the independent variable of interest, and x_2 to x_n are potential confounders, for example, marital status, employment, type of substance abused, etc. b_1 is the log

odds ratio of say “abstinence” for “late age of initiation” after controlling for potential confounding variables in the model, x_1 to x_n .

“Relapsing” and “divorce” and others as dependent variables will be examined in separate logistic regression models in a similar way to that described for” treatment outcome”

Results

Identifying Bivariate Associations with treatment outcome

A cross tabulation and chi-square test was performed (see table 2 below); the only statistically significant relationships with treatment outcomes were found between employment status and admission year. Mood disorders were nearly significant and main drug of abuse was weakly significant concerning good treatment outcome.

The association between the dependent variable (good treatment outcome) and independent variables such as age, education, employment family history of drug and alcohol, mental illness, main drug of abuse and admission years were not statistically significant. The associations that were found to be highly significant was between the good treatment outcome and the admission years ($p=0.03$), followed by employment status ($p=0.05$). Another nearly significant association was found between mood disorders and good outcome ($p=0.06$) although there was a weak association between main drug of abuse and good treatment outcome ($p=0.08$).

The bivariate table also showed that younger patients at first admission (<20-39yrs) were more likely to have good treatment outcomes. The results show that single and married patients end up with better treatment outcome. Patients with higher level of education, e.g., Secondary and above,

showed a higher level of good treatment outcome compared to those with lower education level. When looking at employment status (employed, student, unemployed and retired) it was found that employed drug abusers showed more good treatment outcome in comparison to unemployed patients.

With regard to family history of drug/alcohol abuse, patients with no family history of drug/alcohol abuse were more likely to have good treatment outcome compared to those with a positive history of drug/alcohol history.

Among the patients without a history of mood disorders, a higher proportion was seen of patients with good outcome versus bad outcome. Similar results were found for anxiety and psychotic disorders (table 2).

Exploring the main drug of abuse (included alcohol and other types of drugs with different routes), patients with alcohol use had better outcomes. Heroin users followed by polysubstance users did better in treatment than those with other drug problems.

Finally, the admission year in the recent years of the study from 2008-2011, showed a significant relationship with better outcome, which could be due to improvements in the diagnostic tool and improving the system in the NRC and better patient rehabilitation programs and follow up.

Table (2): The association between the dependent variable (treatment outcome) & independent variables

Variables	Good outcome	Bad outcome	Total (n)	p-value
Age group at admission(yrs.)				
<20	14	4	18	0.64
20-29	94	43	137	
30-39	96	32	128	
40+	55	21	76	
		100	359	
Marital Status				
Married	107	37	144	0.73
Single	114	48	162	
*Others	37	15	52	
Education Status				
Primary or less	48	21	69	0.66
Middle School	79	28	107	
Secondary School	80	34	114	
Post-secondary	43	12	55	
Employment Status				
Employed/Student	88	23	111	0.05
Unemployed	72	153	225	
Retired	15	3	18	
Family History of Drug Abuse				
Yes	48	13	61	0.34
No	201	78	279	
Family History of Alcohol abuse				
Yes	71	38	101	0.42
No	178	61	239	
Anxiety Disorders				
Yes	15	8	23	0.46
No	233	85	318	
Yes				
Mood disorders				
Yes	14	11	25	0.06
No	234	82	316	
Psychotic disorders				
Yes	10	8	18	0.10
No	238	85	323	
Main Drug of Abuse				
Heroin	54	19	73	0.08
Marijuana	34	5	39	
Benzodiazepines	21	4	25	
Amphetamines	6	4	10	
Alcohol	96	51	147	
Inhalants	5	1	6	
Polysubstance	43	14	57	
Admission year (old/recent)				

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2002-2007	71	44	115	0.03
2008-2011	188	56	244	

***Others for Marital status: Divorced, Widowed/Separated**

Table (3): Unadjusted and adjusted associations for good treatment outcomes among NRC patients. Abu Dhabi, UAE (2002-2011) (n=591)

Characteristics measured	<i>Unadjusted</i> 95.0% CI		<i>Adjusted</i> 95.0% CI	
	Odds ratio (Lower, Upper)	p-value	Odds ratio (Lower, Upper)	p-value
Marital Status		0.73		0.99
Married (Reference)	1		1	
Single	1.22 (0.74 , 2.01)		0.95 (0.38,2.32)	
(separated, widowed, and divorced together)	1.17 (0.57,2.37)		0.95 (0.36,2.50)	
Main Drug of Abuse		0.10		0.24
Heroin (Reference)	1		1	
Marijuana	1.08 (0.48,2.40)		0.88 (.033,2.33)	
Benzodiazepine	0.45 (0.15,1.38)		0.37 (0.09, 1.44)	
Amphetamine	0.58 (0.17,1.99)		0.59 (0.15,2.34)	
Alcohol	2.048 (0.50,8.35)		1.94 (0.38,9.65)	
Inhalants	1.63 (0.82,3.26)		1.49 (0.56,3.94)	
Poly-substance	0.61 (0.06, 5.71)		0.58 (0.05,7.12)	
Employment Status		0.04		0.17
Employed/Student (reference)	1		1	
Unemployed	1.31 (.35,4.90)		0.93 (0.21,4.14)	
Retired	2.35 (.668,3.8)		1.74 (0.43,7.11)	
Education Status		0.65		0.97
Primary or less (reference)	1		1	
Middle School	1.56 (0.69,3.56)		0.95 (0.36,2.52)	
Secondary School	1.27 (0.58,2.75)		0.84 (0.34,2.11)	
Post-secondary	1.52 (0.71,3.24)		0.98 (0.40,2.39)	
Admission year (old/recent)		0.00		0.00

2002-2007	0.48 (0.29,0.77)		2.46 (1.30,4.64)	
2008-2011 (reference)	1		1	
Age group at admission(yrs.)		0.64		0.23
<20 (reference)	1		1	
20-29	0.74 (0.22,2.53)		2.79 (0.57,13.61)	
30-39	1.19 (0.64,2.22)		1.73 (0.70,4.27)	
40+	0.87 (0.45,1.66)		0.88 (0.39,1.98)	
Family History of Drug Abuse		0.29		0.58
Yes	0.69 (0.35,1.35)		0.79 (0.35,1.78)	
No (reference)	1		1	
Family History of Alcohol abuse		0.42		0.66
Yes	0.23 (0.73,2.06)		1.15 (0.60,2.18)	
No(reference)	1		1	
Anxiety Disorders		0.40		0.55
Yes	0.68 (0.28,1.67)		1.42 (0.43,4.64)	
No (reference)	1		1	
Mood Disorders		0.05		0.22
Yes	0.44 (0.19,1.02)		0.53 (0.19,1.46)	
No (reference)	1		1	
Psychotic Disorders		0.10		0.15
Yes	0.44 (0.17,1.16)		0.42 (0.13,1.38)	
No (reference)	1		1	

Multivariate logistic regression

Table (3) shows the results of multiple regression analysis of risk factors for relapses. Adjusting for outcomes, those who reported to have been admitted in the recent years between 2007 until 2011, had lower risk of relapse, and this remained significant after adjustment. While employment status was significant in univariate analysis, it becomes insignificant after adjustment, similarly to mood disorders.

Discussion

The study analyzed factors associated with outcomes according to seven hypotheses based on the literature. Only statistically significant relationships with treatment outcomes were found between employment status and admission year. Mood disorders were nearly significant and main drug of abuse was weakly significant concerning good treatment outcome.

Examining each of the hypotheses in detail, the first hypothesis predicted that early age of initiation of substance use (measured by the age at the first admission) would be associated with poor outcome. The results showed that there was no significant association. This finding goes against what has been generally found in the literature (Dube et al 2003. Miller and Moyers, 2014. A possible explanation for the finding is that actual data on the initiation of substance use was not available in the data set and the age of first admission was used as a proxy indicator of age of first use. The results show no significant association between early age of admission and outcome. Future research should collect direct information on the age of initiation to establish whether it is associated with poor outcome in this population.

No significant associations were found between the levels of education and treatment outcomes. This finding goes against what is generally found in the literature (Xie and McHugo, 2005). The level of education may be inconsistently associated with outcome in different populations in different ways. Low level of education could mean early initiation into drug use, emotional difficulties and economic hardships or a combination of these factors. It has been also argued that a higher level of education could help patients get more out of the treatment programs. The NRC data shows that the majority of NRC patients had completed middle, secondary and post-secondary education.

No association was found between marital status and outcome. This finding goes against what has been consistently found in the literature (Sharif, 2011). The number of divorced patients 13% in the dataset was comparable with the available national data for men. The rate for UAE nationals from Abu Dhabi in 2010 was 14.2 (Webster, 2012) that indicates that divorce is an issue with this population. Perhaps what the results may indicate is that family support (patient's parents, brothers and sisters) continues and this compensates and is different from isolation that is found in other cultures. It is also possible that the criteria used in this study for defining outcome do not capture longer-term outcome data that studies in the literature use.

A significant association was found between employment and treatment outcome, which is same to what is found in the literature (Moos and Moos, 2006).

No association was found between family history of addiction and treatment outcome. The literature on family history and outcome is not consistent. Our finding is consistent with the findings of Coviello et al., 2004. In countries with low incidence and prevalence of substance misuse and where substance use is culturally not acceptable, it would be expected that family histories would also be less prevalent.

The data was analyzed according to the diagnosis of major psychiatric disorders that was available in the data. A nearly significant association was found between mood disorder and poor outcome. The association between anxiety, psychotic disorders and poor outcomes approached but did not attain statistical significance. The significant association with mood disorders (mainly depression) is consistent with the literature (McLellan et al., 1983; Drake et al., 1996; Compton et al., 2003).

The analysis of the main drug of abuse and outcome also showed a weakly significant association. Alcohol use and heroin use followed by polysubstance (prescribed medication) was associated with poor outcome compared to other substances of abuse.

A significant association was found between year of admission and treatment outcome in the recent years of the study from 2008-2011, as the results showed a significant relationship with better outcome, which could be due to improvements in the diagnostic tool, improving the system in the NRC and better patient rehabilitation programs, and follow up.

The analysis focused on the end of a treatment episode as a time point for outcome assessment. Most studies in the literature look at outcomes over a longer period. The available dataset did not capture longer-term outcome data with set outcome criteria using in standardized instruments such as the ASI (McLellan et al., 1980). This is a major weakness of the analysis and the study. What it does show is the importance of collecting such data routinely so that proper outcomes can be evaluated. Because of this weakness it is not possible to draw any firm conclusions about the findings to say that common associations found in the literature are not found in this population.

Strengths and limitations

The strength of this study is that it is one of the first attempts to examine factors associated with treatment outcomes in the UAE. In doing so it has pointed to specific data that we should be collecting in future to measure this.

The main limitation of this study was that no standard instrument was used to measure outcomes and the outcome used was derived from crude and simple criteria. In addition, treatment outcome was measured in the short-term, whilst studies in the literature uses follow up periods of 12 to 18 months. The ideal way to measure outcome is to administer a standard instrument and repeat it at different intervals. An example of a limitation is that a key variable the age of initiation of drug use was not measured but approximated by the age of seeking treatment.

Future recommendations

Recommendations from this study is to have in place an instrument such as the ASI that would collect data on admission, at discharge and at routine intervals after discharge by following up patients. If such a system was in place, the NRC data could be analyzed and compared with studies found in the literature. Such an instrument could be added to the electronic patient note system at the NRC. If this study leads to such a system put in place it would make this a very useful contribution. If predicted associations or new associations are found in this population, it should help tailor treatment programs to suit the patients. This would be the main benefit of this type of research.

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