

Research report on
a longitudinal study of treatment outcomes for psychotropic substance abusers

Submitted to
Beat Drug Fund Association

Submitted by

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Executive Summary

The objective of this research was to evaluate the treatment outcomes for psychotropic substance abusers attending Substance Abuse Clinics (SACs) and Counselling Centres for Psychotropic Substance Abusers (CCPSAs).

Between June 2008 and April 2010, 145 substance abusers were recruited into the research project, 124 from SACs and 21 from CCPSAs. Only 15 (10%) participants received the one-year follow-up assessment; the majority of the participants either refused to be interviewed or could not be traced. Amongst these 15 participants, none of them received the two-year follow-up assessment. Information on the treatment modality of each participant was held at individual SACs and was obtained from their case notes at one-year (N = 124) and two-year follow-up (N = 44).

Ketamine was the most common lifetime abused drug among participants, followed by amphetamine/ice and Midazolam/Nimetazepam/Zopiclone/Imovane. The mean age of onset for psychotropic substance misuse was 22.2 years with a duration of 7.2 years. The most common psychiatric disorder was psychosis (37.1%). More than 90% of SAC patients were offered medication during the treatment period and 25% were referred to an occupational therapist, a medical social worker or a clinical psychologist. Retention rates in the first and second year of SAC treatment were 71.8% and 23.4%, respectively. The possible factors influencing treatment dropout included not suffering from psychosis and not receiving a prescription from the treating psychiatrists. However, as most of the participants dropped out of the study, case note review was not sufficient for measuring treatment outcome. Thus, for future studies, SACs and other service providers should use a standardized outcome measure such as the Christo Inventory for Substance-Misuse Services.

行政撮要

是次研究的目的是評估吸食危害精神毒品人士在物質誤用診所和濫用精神藥物者輔導中心的治療成效。

是次研究於二零零八年六月至二零一零年四月共招募到 145 位危害精神毒品濫用者，當中包括 124 位接受物質誤用診所服務的人士和 12 位使用濫用精神藥物者輔導中心的人士。當中只有十五人〔10%〕接受一年後的跟進評估，大部分參與者拒絕再次受訪問或無法追查。在這十五名參與者，沒有任何一位再次接受第二年的跟進評估。接受治療的方式資料會從參與者在物質誤用診所的案例中獲取，一年期的案例跟進有 124 位，兩年期的則有 44 位。

氯胺酮〔俗稱 k 仔〕是最常被吸食的危險精神毒品，其次為安非他命〔俗稱冰〕和鎮靜劑〔包括藍精靈、硝甲西泮、佐匹克隆〕。首次吸食毒品的平均年齡為 22.2 歲，年期 7.2 年。最常見的精神障礙是精神病（37.1%）。物質誤用診所為超過百分之九十的人士提供藥物治療，另外百分之二十五的人士被轉介到職業治療師，醫務社工和臨床心理學家接受非藥物治療。繼續接受第一和第二年物質誤用診所治療的百分率分別為百分之七十一點八〔71.8%〕和二十三點四〔23.4%〕。停止接受治療的可能因素包括濫毒者沒有罹患精神病和沒有精神科醫生處方藥物。大多數參與者離開研究，案例查閱是一個不全面的衡量治療結果的方式，因此如要從而作進一步研究，一個標準化的測量結果的測量表格〔如 Christo Inventory for Substance-Misuse Services〕應被使用。

Introduction

Substance abuse and addiction has been a worrying social problem in Hong Kong since the 1990s. The long-term use of drugs impedes changes in addicts' perspectives and addictive behaviour. Reducing physical or emotional pain is the most common reason for involvement in drug abuse; in other words, addicts treat drugs as an escape route. Other common factors include family and/or peer influence. The effects of drug use are not only seen in adult abusers, but also in teenagers. The social environment is influential to the growth of teenagers and the increasing prevalence of drug use may create a false perception of its harmful effects. Therefore, providing education in schools should be at the top of the agenda.

The misuse of psychoactive drugs has increased in the past two decades, especially among young people (Central Registry of Drug Abuse Fifty-six Report 2000-2009). A population-based survey conducted in 2001/2002 revealed that in a period of 12 months, 5% of males and 1.8% of females in the Hong Kong adult population had abused psychotropic substances (Lau et al., 2005). The increasing rate and the lowering age of drug misusers implies that "drug misuse" is gradually becoming one of the most significant problems in Hong Kong. Existing evidence suggests that psychotropic drug abuse is associated with different types of psychiatric comorbidities (Mahoney et al., 2008; Morgan et al., 2010). As a result, providing appropriate treatment and rehabilitation services to drug abusers is crucial.

Drug treatment and rehabilitation services adopt a multi-modality approach to cater for the divergent needs of abusers from different backgrounds. Services are provided by the Correctional Services Department, the Department of Health, non-governmental organizations (NGOs), the Social Welfare Department, the subvention of the Social Welfare Department, and the Hospital Authority (HA), including compulsory and voluntary programmes.

Eleven counselling centres for psychotropic substance abusers (CCPSA) in Hong Kong offer relevant information, counselling, treatment and rehabilitation to drug abusers. Medical support services are also available for drug abusers who require elementary medical treatment. The staff of each CCPSA includes experienced registered social workers and a Registered Nurse (Psychiatry).

The HA runs seven Substance Abuse Clinics (SACs) under the specialism of Psychiatry in Hong Kong. The SACs are outpatient clinics that accept referrals from CCPSAs, voluntary agencies and other health care providers, as well as providing direct services for psychotropic substance abusers and/or opiate narcotics abusers. All SACs provide pharmacological treatments and counselling by social workers, whereas other forms of aftercare services, such as religious and occupational counselling, are additional.

The objective of this study was to evaluate the treatment outcome for psychotropic substance abusers in Substance Abuse Clinics (SAC) and Counselling

Centres for Psychotropic Substance Abusers (CCPSA).

Study Objectives

- (1) To document the level of substance abuse and other sociopsychological treatment outcomes in new patients attending three SACs or two CCPSAs 1 and 2 years after receiving treatment.
- (2) To perform a literature review of the treatment models of psychotropic substance abuse.

Study Methodology

Study Design

A prospective longitudinal study of a cohort of clients attending substance abuse clinics.

Study Site

This study was carried out at three Substance Abuse Clinics run by the Hospital Authority, Hong Kong (Tuen Mun Substance Abuse Clinic (TMSAC), Prince of Wales Hospital Substance Abuse Clinic (PWHSAC) and North District Hospital Substance Abuse Clinic (NDHSAC)), and two Counselling Centres for Psychotropic Substance Abusers (Hong Kong Lutheran Social Services – The Evergreen Lutheran Centre and Hong Kong Sheng Kung Hui Welfare Council Neo-Horizon).

Recruitment of Participants

1. Recruitment began in June 2008. Patients were invited to participate in the study on their admission to the participating SACs and CCPSAs.
2. The inclusion criteria were: (a) starting a new treatment episode; (b) presenting with a psychotropic substance-related problem (ketamine, MDMA, benzodiazepines/Zopiclone, cannabis, cough medicine, methylamphetamine, and cocaine); (c) able to provide a contact address and phone number in Hong Kong for follow-up. Patients who could not give valid consent were excluded.
3. One-year follow-up interviews began in May 2009. After a year in treatment, participants were contacted by a staff member and were asked to conduct a follow-up interview.
4. A two-year follow-up review of case notes began in June 2010 and ended in April 2011.

Data collection

Data were obtained from the baseline assessments, one-year follow-up and two-year follow-up assessments. Socio-demographic, clinical and neuropsychological characteristics, and urine analysis were assessed over the study period. A case note review was conducted for all SAC participants 1 and 2 years after being admitted to the treatment programmes. Participants were paid HK\$100 for each completed assessment.

Baseline Assessment

A trained research assistant collected the socio-demographic characteristics of the patients in a structured intake interview, including age, sex, marital status, education, occupation and substance abuse history. Patients' medical treatment history over the previous 24 months, including the number and duration of addiction treatments (inpatient, rehabilitation, methadone), general medical and psychiatric treatment episodes, was recorded. All patients were assessed using the following instruments.

1. The Severity of Dependence Scale (SDS) (Gossop et al., 1995) is a short, easily administered scale which can be used to measure the degree of dependence experienced by users of different types of drugs. The SDS contains five items, all of which are explicitly concerned with the psychological components of dependence. Each of the five items is scored on a 4-point scale (0-3). The total score is obtained by summing scores for the five items, with higher scores indicating a higher level of dependence. These items are specifically concerned with impaired control over drug taking and with preoccupation and anxieties about drug use.
2. The Chinese version of the Addiction Severity Index (ASI) - Lite version (Cacciola et al., 2007) is a shorter version of the ASI, designed to be administered in 30 minutes. The ASI is a multi-dimensional interview used to measure the substance use, health and social problems of those with alcohol and other drug problems, both at admission to treatment and at subsequent follow-ups (McLellan et al., 2006). Composite scores have been derived to measure improvement. The composite scores are measures of problem severity, with higher scores indicating more severe problems.
3. Version 8 of the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES 8D) provides information on respondents' perceptions of the severity of their drug abuse problems and their readiness to engage in behaviour that reduces the use of drugs (Miller & Tonigan, 1996). Three subscales of the SOCRATES provide information on different aspects of the readiness-to-change continuum. The Recognition subscale reflects the extent to which respondents acknowledge they are experiencing a substance abuse problem and recognize that harm will come if they do not change. The Ambivalence subscale reflects the extent to which respondents are conflicted about the pros and cons of their substance use pattern. The Taking Steps subscale reflects the extent to which respondents are actively engaged in the change process.
4. The Beck Depression Inventory Short Form (BDI-SF) (Beck, 1961; Furlanetto et al., 2005; Shek, 1990) consists of 13 items (Beck & Beck, 1972) and is used to measure depressive symptoms. Each item is scored on a 4-point Likert scale and higher scores indicate a greater likelihood of depression. The sensitivity and specificity of a cut-off at 13 are 93.5% and 96%, respectively (Furlanetto, et al., 2005). The anxiety subscale of the Hospital Anxiety Depression Scale (HADS-A) (Leung et al., 1993) was used to measure anxiety symptoms. Responses are scored on a 4-point Likert scale ranging from 0–3, on which a score of 0 represents “not at all”, 1 = “occasionally”, 2 = “quite often” and 3 = “very often indeed”. Responses to each of the seven items are based on the relative frequency of anxiety symptoms over the past week. Scores range from 0 to 21, with higher scores indicating a greater likelihood of anxiety. The sensitivity of a cut-off at 4/5 is 96% (Bunevicius et al., 2007).
5. The Treatment Perceptions Questionnaire (TPQ) (Marsden et al., 2000) is a brief 10-item instrument developed specifically to assess treatment satisfaction amongst the substance misuse treatment population. Items are scored on a 5-point Likert scale (0–4), with higher scores reflecting greater satisfaction with treatment. The questionnaire covers two areas that influence the extent of satisfaction with the treatment received, the staff and programme perceptions.
6. Urine screening tests for substance abuse were conducted. Assays for opiates, methadone, ketamine, amphetamines and cocaine metabolite were carried out using

homogenous enzyme immunoassay procedures and ultra-performance liquid chromatography (Kaufmann et al., 2007).

Cognitive assessments were also performed to assess the association between the chronic consumption of several drugs of abuse and the presence of neuropsychological impairment in a range of functions (Verdejo-Garcia et al., 2004). The instruments used for the cognitive assessment were as follows.

- a. Executive functioning was assessed by the Frontal Assessment Battery (FAB) (Dubois et al., 2000).
- b. Attention was assessed by Digit Span Forward and Backward (Wechsler, 1997).
- c. Verbal Memory was evaluated by Story Recall: Immediate and Delayed Recall (Wechsler, 1997).
- d. Visual memory was assessed by Picture Recall: Immediate, Delayed Recall, Delayed Recognition (Wechsler, 1997).
- e. Visuomotor speed was assessed by the Digit Cancellation Task (Wechsler, 1997).
- f. Visuoconstruction skills were assessed by the Clock Drawing Test (Wechsler, 1997).
- g. Language ability was assessed by the Modified Boston Naming (Wechsler, 1997).

Follow-Up (T2 and T3) Assessments

Participants' medical records, which included the treatment modality (prescription drugs, ordered investigations and referral to allied health services), were obtained from the Clinical Management System (CMS) in order to monitor and evaluate the progress and outcome of treatment. The number of patients who dropped out of the programmes was also noted. . The definition of "PRN" was patients whose psychiatrist decided to discontinue the treatment, as "dropout" if they consecutively missed the last two sessions of treatment against medical advice, and as "retention" if they remained in treatment and attended most of the appointments during the study period.

Statistical Analyses

The statistical analyses were performed using SPSS Version 17.0 (SPSS, Chicago, USA). Descriptive data are presented as means, medians or proportions as appropriate to categorize participants' individual characteristics. To compare the baseline demographic and clinical characteristics of the retention and dropout groups, independent t-tests were used for continuous variables and χ^2 tests for categorical variables. Comparisons of participants at intake and follow-up are presented using paired t-tests. Bivariate analyses were conducted to compare the characteristics of the retention and drop-out groups. Significance was set at 0.05 (two-tailed).

Results

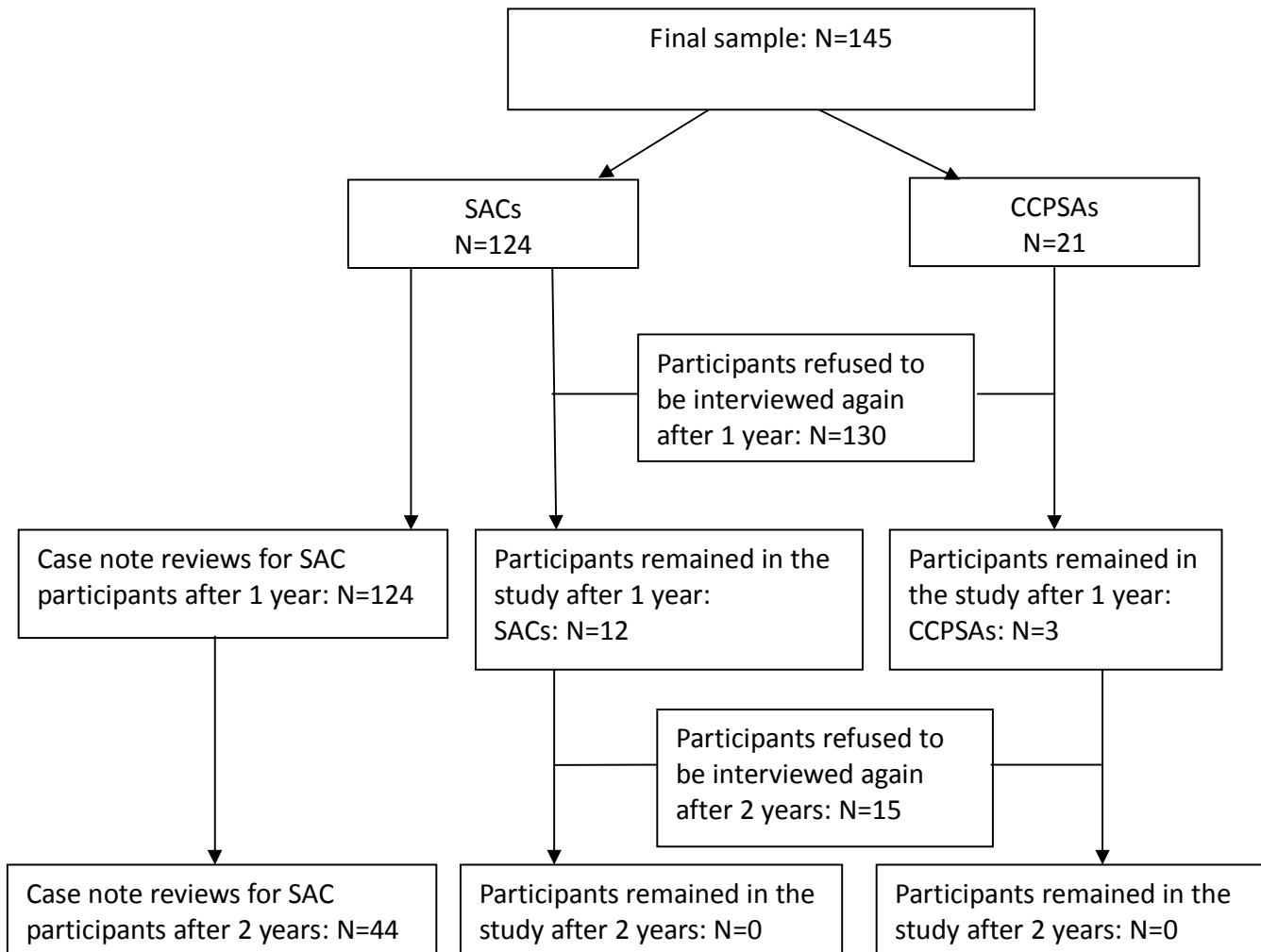
Final Study Population

From June 2008 to April 2010, 467 new cases received outpatient treatment in SACs, of which 343 substance abusers were excluded. The final analysis included 124

SAC cases and 21 CCPSA cases [Figure 1].

Only 15 (10%) participants received the one-year follow-up assessment as the majority of the participants refused to be interviewed or could not be traced. Amongst these 15 participants, none received the two-year follow-up assessment. Information on the treatment modality of each participant provided by the individual SACs was obtained from their case notes at one-year (N = 124) and two-year follow-up (N = 44). However, treatment data for the CCPSA participants were not available [Figure 1].

Figure 1. Flowchart of participant recruitment and drop-out



Baseline Assessment

General Characteristics of the Study Sample

The socio-demographic characteristics and referral pattern of the participants are depicted in Table 1. The mean age of the 145 participants was 27.9 ± 10.4 (range 14–63), and 61% were male. The average education level was 9.0 ± 2.4 years, 73.0% of the abusers had never married, and 61% were currently unemployed. A criminal record was found in 56.6% of participants. Almost 60% of participants were referred by other HA facilities or by general practitioners, and 26.2% had been receiving social services from CCPSAs or other NGOs. The mean onset age of substance abuse was 21 and the average duration of substance misuse was 6.4 years. Lifetime drug treatment was found in 33.8% of participants and 26.9% of participants had been receiving a variety of drug treatments in the past two years with a mean duration of 4.5 months [Table 1].

Table 1. Demographic characteristics of all participants, N=145

Variables	mean \pm s.d / n (%)
Age (Year)	27.9 \pm 10.4
Age range (Years)	
<21	45 (31.0)
21-30	47 (32.4)
31-40	39 (26.9)
41-50	6 (4.1)
>51	8 (5.5)
Sex (male)	89 (61.4)
Education (year)	9.0 \pm 2.4
Marital status	
<i>Never married</i>	103 (73.0)
<i>Married</i>	22 (15.2)
<i>Separated/Divorced</i>	20 (13.8)
Occupation	
<i>Employed/Student</i>	56 (38.6)
<i>Unemployed</i>	89 (61.4)
Criminal Record (Yes)	82 (56.6)
Source of referral	
<i>HA facilities or by general practitioners</i>	86 (59.3)
<i>Social services (CCPSA/other social services)</i>	38 (26.2)
<i>Justice system</i>	14 (9.7)
<i>Detoxification services</i>	5 (3.5)
<i>Others</i>	2 (1.4)
Age of onset of substance misuse (years)	21 \pm 8.1
Duration of substance misuse (years)	6.4 \pm 6.4
Treatment history (lifetime)	49 (33.8)

Variables	mean \pm s.d / n (%)
Treatment type in past 2 years	39 (26.9)
<i>HA (IP/OP)</i>	27 (18.6)
<i>Residential Detox Facilities</i>	8 (5.5)
<i>Other</i>	3 (2.1)
<i>Methadone</i>	1 (0.7)
Treatment duration in past 2 years (months)	3.2 \pm 6.4

CCPSA = Counselling Centre for Psychotropic Substance Abusers

HA= hospital authority

IP=inpatient

OP=outpatient

Drug Abuse Patterns of the Study Sample at Baseline

According to participants' self-reports, ketamine was the most common lifetime abused drug, followed by amphetamine/ice. The duration of ketamine use was 3.8 ± 2.9 years; amongst the ketamine users, 63.9% had used the drug in past 30 days [Table 2].

Table 2. Participants' patterns of alcohol/drug use, N=145

Type of drug	Lifetime use N (%)	Lifetime (years) mean \pm s.d	Used in the past 30 days* N (%)	Past 30 days (days) mean \pm s.d
Ketamine	86 (59.3)	3.8 ± 2.9	55 (63.9)	7.5 ± 10.8
Ice/Amphetamine	48 (33.1)	2.1 ± 2.2	23 (47.9)	3.4 ± 7.2
Benzodiazepines and non-benzodiazepine hypnotics	50 (34.5)	1.7 ± 3.4	31 (62.0)	4.4 ± 10.3
Cough medicine	30 (20.7)	6.9 ± 6.0	14 (46.7)	10.5 ± 13.5
Ecstasy	27 (18.6)	3.2 ± 2.8	4 (14.8)	1.0 ± 3.9
Heroin	24 (16.6)	10.3 ± 11.6	8 (3.3)	3.3 ± 7.4
Cannabis	22 (15.2)	4.5 ± 6.3	4 (18.2)	0.9 ± 2.4
Cocaine	21 (14.5)	2.0 ± 2.1	6 (28.6)	0.9 ± 1.9
Methaqualone (Mandrax)	6 (4.1)	1.3 ± 1.0	2 (33.3)	1.3 ± 2.2
Methadone	4 (2.8)	8.9 ± 7.8	2 (50.0)	14.5 ± 16.8
Other hallucinogens	2 (1.4)	0.6 ± 0.6	0 (0)	-
Other Opiates/ Analgesics/ Tramadol/Panadol	2 (1.4)	12.5 ± 10.6	1 (50.0)	15.0 ± 21.2
Barbiturates	1 (0.7)	3.0 ± 0.0	1 (100.0)	30.0 ± 0.0
Other inhalants	1 (0.7)	1.0 ± 0.0	0	-

*Percentage refers to the proportion of lifetime users who had used the drug in the past 30 days.

According to the urine screening test results, the most commonly drug used in the previous month was ketamine (27.6%), followed by cough medicine (24.1%), and the least abused drugs were barbiturates and cannabis; 20.7% reported no drug use in the previous month [Table 3].

Table 3. Participants' urine analysis at baseline, N=141*

Type of drugs	N (%)
Ketamine	40 (27.6)
Cough medicine	35 (24.1)
None	30 (20.7)
Opiates	26 (17.9)
Benzodiazepines and non-benzodiazepine hypnotics	24 (17.0)
Amphetamines	12 (8.3)
Methadone	7 (4.8)
Cocaine	3 (2.1)

Type of drugs	N (%)
Analgesics	2 (1.4)
MDMA	1 (0.7)
Barbiturates	1 (0.7)
Cannabis	1 (0.7)

*4 participants had missing data

Self-Report Items and Cognitive Performance of the Study Sample at Baseline

The mean scores for the SDS, SOCRATES 8D, Treatment Perception Questionnaire, and ASI are displayed in Table 4. The mean BDI and HADSA scores were 13.5 ± 8.3 and 9.3 ± 5.0 , respectively, and 54.5% of participants scored above the clinical cut-off point for depression and 69.7% for anxiety disorder. Table 5 illustrates participants' performance on the cognitive tests.

Table 4. Mean scores for self-report items, N=145

Instruments	mean \pm s.d/ n (%)
Beck Depression Inventory	13.5 ± 8.3
Beck Depression Inventory (\geq cutoff point 13)	79 (54.5)
Anxiety Subscale of the Hospital Anxiety and Depression Scale	9.3 ± 5.0
Anxiety Subscale of the Hospital Anxiety and Depression Scale (\geq cutoff point 8)	101 (69.7)
Severity of Dependence Scale	7.0 ± 4.3
SCORATES 8D	
<i>Recognition</i>	26.8 ± 5.6
<i>Ambivalence</i>	14.0 ± 3.1
<i>Taking Steps</i>	31.7 ± 5.3
Treatment Perception Questionnaire	
<i>Total</i>	27.5 ± 4.7
<i>Staff perceptions</i>	13.6 ± 3.0
<i>Programme perceptions</i>	13.9 ± 2.9
ASI composite score	
<i>Medical</i>	0.2 ± 0.3
<i>Employment</i>	0.6 ± 0.2
<i>Alcohol</i>	0.1 ± 0.1
<i>Drug</i>	0.1 ± 0.1
<i>Legal</i>	0.3 ± 0.7
<i>Family</i>	0.3 ± 0.3
<i>Psychiatry</i>	0.4 ± 0.3

SCORATES 8D= Version 8 Stages of Change Readiness and Treatment Eagerness Scale;
ASI= Addiction Severity Index

Table 5. Participants' cognitive performance at baseline, N=145

Cognitive domains	Cognitive tests	mean \pm s.d.
Executive	Frontal Assessment Battery	16.20 ± 1.75

Cognitive domains	Cognitive tests	mean \pm s.d.
functioning		
Attention	Digit Span Forward	11.50 \pm 1.51
Working memory	Digit Span Backward	7.17 \pm 2.45
Language	Verbal Fluency (Animals)	13.79 \pm 3.81
	Modified Boston Naming Test	14.87 \pm 0.49
Verbal Memory	Story Recall (Story A) (Immediate Recall-LMI)	6.15 \pm 2.55
	Story Recall (Story A) (Delayed Recall-LMII)	6.17 \pm 2.77
Visual Memory	Picture Recall (Immediate Recall)	6.21 \pm 1.40
	Picture Recall (Delayed Recall)	5.18 \pm 1.70
	Picture Recall (Delayed Recognition)	18.57 \pm 1.97
Visuoconstruction	Clock Drawing Test	4.81 \pm 0.53
Visuomotor Speed	Digit Cancellation Task	35.64 \pm 3.95

One-Year Follow-Up

Case note review

Clinical characteristics and treatment process

One hundred and twenty four case notes were reviewed one year after admission to SAC treatment. Following the review, 89 patients were classified into the retention group, 27 into the dropout group and 8 into the PRN group, according to medical advice and their compliance to treatment. Substance-induced psychotic disorder was the most commonly found psychiatric disorder [Table 6].

Investigation was ordered for 97% of patients; urine drug screening (95%) topped the list of investigations, followed by electrolytes (37%), thyroid function test (36%) and complete blood picture (32%). The mean number of medical appointments made within a year was 9.0 ± 5.7 and the mean adherence was 71%. Referrals to allied health services were made for 25% of the patients. Those who were referred to Occupational Therapy and Clinical Psychology attended a mean of 4.1 and 2.0 appointments, respectively. Approximately 72% of the patients were treated with some form of pharmacotherapy; of these, 40% were treated with antipsychotics, 36% with antidepressants, 16% with other hypnotics, 13% with benzodiazepines, and 5% with mood stabilizers [Table 7].

Table 6. Frequency of psychiatric diagnoses.

Psychiatric diagnoses	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	P ^a
	N (%)	N (%)	N (%)	N (%)	
All diagnoses	69 (55.6)	54 (60.7)	12 (44.4)	3 (37.5)	0.187
Psychosis	46 (37.1)	38 (72.7)	7 (25.9)	1 (12.5)	0.095
<i>Substance-induced psychotic disorder</i>	35 (28.2)	28 (31.5)	6 (22.2)	1 (12.5)	0.384
<i>Schizophrenia (Paranoid)</i>	5 (4.0)	5 (5.6)	0	0	0.359
<i>Psychosis</i>	17 (13.7)	13 (14.6)	4 (14.8)	0	0.507
Depression	22 (17.7)	16 (18.0)	5 (18.5)	1 (12.5)	0.921
<i>Depressive episode</i>	19 (15.3)	14 (15.7)	4 (14.8)	1 (12.5)	0.968
<i>Dysthymia</i>	4 (3.2)	3 (3.4)	1 (3.7)	0	0.864
Bipolar affective disorder	3 (2.4)	2 (2.2)	1 (3.7)	0	0.819
Acute stress disorder	4 (3.2)	3 (3.4)	1 (12.5)	0	0.211
Adjustment disorder	13 (10.5)	9 (10.1)	3 (11.1)	1 (12.5)	0.971
Posttraumatic stress	1 (0.8)	1 (1.1)	0	0	0.820

Psychiatric diagnoses	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	P ^a
disorder					
Personality Disorder	7 (5.6)	6 (6.7)	0	1 (12.5)	0.283
Others	8 (6.5)	7 (7.9)	0	1 (12.5)	0.267
Insomnia	1 (0.8)	1 (1.1)	0	0	0.820
Obsessive Compulsive Disorder	1 (0.8)	1 (1.1)	0	0	0.820

G1= Retention Group

G2 = Dropout Group

G3 = PRN (Pro re nata) Group

^a Chi square test

Table 7. First year SAC treatment process.

	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	P ^a	P G1-G2	P G2-G3	P G1-G3
Variables	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)				
Number of medical appointments offered	9.0 ± 5.7	9.5 ± 5.3	9.4 ± 6.1	1.4 ± 0.7	<0.001	0.999	0.001	<0.001
Number of medical appointments attended	6.4 ± 4.7	7.5 ± 4.7	4.2 ± 3.8	1.3 ± 0.5	<0.001	0.003	0.213	0.001
Number of medical appointments defaulted	2.6±3.0	2.0 ± 2.5	5.2 ± 3.4	0.1 ± 0.4	<0.001	<0.001	<0.001	0.137
Adherence (%) *	71.4 ± 26.0	78.5 ± 21.1	40.6 ± 17.3	95.8 ± 11.8	<0.001	<0.001	<0.001	0.052
All prescriptions	89 (71.8)	69 (77.5)	19 (70.4)	1 (12.5)	<0.001 ^b	0.446	0.004	<0.001
<i>Antipsychotics</i>	49 (39.5)	39 (43.8)	10 (37.0)	0	0.050 ^b	0.532	0.042	0.015
<i>Antidepressant</i>	45 (36.3)	37 (41.6)	8 (29.6)	0	0.046 ^b	0.265	0.080	0.020
<i>Others hypnotics</i>	20 (16.1)	15 (16.9)	4 (14.8)	1 (12.5)	0.929 ^b			
<i>Benzodiazepines</i>	16 (12.9)	14 (15.7)	2 (7.4)	0	0.280 ^b			
<i>Mood stabilizers</i>	6 (4.8)	6 (6.7)	0 (0)	0	0.289 ^b			
Allied health service referrals								
<i>All referrals</i>	31 (25.0)	22 (24.7)	9 (33.3)	0	0.160 ^b			
<i>Occupational Therapy</i>	15 (12.1)	9 (10.1)	6 (22.2)	0	0.133 ^b			
<i>Medical Social Worker</i>	15 (12.1)	12 (13.5)	3 (11.1)	0	0.526 ^b			
<i>Clinical Psychology</i>	11 (8.9)	8 (9.0)	3 (11.1)	0	0.623 ^b			
Number of allied health services								

	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	P ^a	P G1-G2	P G2-G3	P G1-G3
Variables	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)				
appointments attended								
<i>Occupational Therapy (N=15)</i>	4.1 ± 3.5	5.1 ± 3.1	2.5 ± 3.7	0	0.164			
<i>Clinical Psychology (N=11)</i>	2.0 ± 2.1	2.8 ± 2.2	0.7 ± 0.6	0	0.194			

G1= Retention Group

G2 = Dropout Group

G3 = PRN (Pro re nata) Group

^a ANOVA unless otherwise specified

^b Chi square test

*Adherence equals the number of attended appointments divided by the total number of appointments made during the treatment period times 100.

Comparison between the retention and dropout group

A borderline difference (p=0.095) was found in the presence of psychosis between the three groups of patients from the SACs; 72.7%, 25.9% and 12.5% for retained, dropout, and PRN patients respectively. The number of medical appointments offered to retained and dropout patients was similar (9.5 + 5.3 vs. 9.4 ± 6.1), but the number of medical appointments attended (p=0.003), defaulted (p<0.001) and adherence (p<0.001) differed significantly. The PRN group was less likely to receive pharmacological treatment (p<0.001). No difference was found between the groups for the type of medication or the number of referrals to allied health services [Table 7].

Table 8. Characteristics of participants by treatment status at one-year follow-up

	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	P ^a	P G1-G2	P G2-G3	P G1-G3
Variables	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)				
Age (years)	29.4 ± 10.5	29.9 ± 11.0	30.1 ± 9.2	21.4 ± 4.0	0.081	0.996	0.096	0.070
Sex (male)	72 (58.1)	48 (53.9)	19 (70.4)	5 (62.5)	0.306 ^b			
Education (years)	8.8 ± 2.5	8.9 ± 2.6	8.5 ± 2.2	9.6 ± 1.7	0.540			
Marital status								
<i>Never married</i>	82 (66.1)	53 (59.6)	22 (81.5)	7 (87.5)	0.209 ^b			
<i>Married</i>	22 (17.7)	19 (21.3)	2 (7.4)	1 (12.5)				
<i>Separated/ Divorced</i>	20 (16.1)	17 (19.1)	3 (11.1)	0				
Employment <i>employed/student</i>	46 (37.1)	28 (31.5)	12 (44.4)	6 (75.0)	0.034 ^b	0.214 ^b	0.129 ^b	0.013 ^b

	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	P ^a	P G1-G2	P G2-G3	P G1-G3
Variables	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)	mean ± s.d. / N (%)				
<i>unemployed</i>	78 (62.9)	61 (68.5)	15 (55.6)	2 (25.0)				
Criminal record	66 (53.2)	46 (51.7)	16 (59.3)	4 (50.0)	0.774 ^b			
Source of referral								
<i>HA facilities or by General Practitioners</i>	86 (69.4)	61 (68.5)	22 (81.5)	4 (50.0)	0.618 ^b			
<i>Social services (CCPSA/other social services)</i>	31 (25.0)	22 (24.7)	5 (18.5)	4 (50.0)				
<i>Detoxification service</i>	5 (4.0)	5 (5.6)	0 (0)	0 (0)				
<i>Justice system</i>	1 (0.8)	1 (1.1)	0 (0)	0 (0)				
<i>Others</i>	1 (0.8)	0 (0)	0 (0)	0 (0)				
Age of onset of substance misuse (years)	22.2 ± 8.4	22.5 ± 8.7	23.0 ± 8.1	15.8 ± 3.8	0.207			
Duration of substance misuse (years)	7.2 ± 6.6	7.4 ± 7.0	7.2 ± 6.0	5.5 ± 3.2	0.436			
Drug Treatment history (lifetime)								
Drug Treatment history (past 24m) (yes)	37 (29.8)	29 (32.6)	7 (25.9)	1 (12.5)	0.435 ^b			
Drug Treatment type in past 2 years	51 (41.1)	38 (42.7)	8 (33.3)	4 (50.0)	0.598 ^b			
<i>HA (Inpatient/outpatient)</i>	27 (21.8)	22 (24.7)	4 (14.8)	1 (12.5)	0.912 ^b			
<i>Methadone</i>	1 (0.8)	1 (1.1)	0 (0)	0				
<i>Residential Detox Facilities</i>	6 (4.8)	4 (4.5)	2 (7.4)	0				
<i>Others</i>	3 (2.4)	2 (2.2)	1 (3.7)	0				
Treatment duration in past 2 years (months)	3.3 ± 6.6	2.9 ± 6.2	5.6 ± 8.6	0.5 ± 0.0	0.566			
Beck Depression Inventory score	14.6 ± 8.2	14.4 ± 7.8	17.2 ± 9.0	9.1 ± 8.2	0.042	0.254	0.039	0.190
Anxiety subscale of the Hospital Anxiety and Depression Scale score	10.0 ± 4.9	10.3 ± 4.7	10.1 ± 4.9	6.3 ± 5.6	0.078	0.984	0.117	0.062
Severity of Dependence Scale score	7.6 ± 4.2	7.9 ± 4.1	7.4 ± 3.9	4.5 ± 5.0	0.081	0.858	0.181	0.066
SCORATES 8D								
<i>Recognition</i>	27.6 ± 6.2	27.8 ± 5.0	28.3 ± 5.7	25.5 ± 6.7	0.419			
<i>Ambivalence</i>	14.4 ± 3.0	14.5 ± 2.8	14.5 ± 2.9	11.8 ± 4.5	0.038	0.999	0.055	0.031
<i>Taking Steps</i>	31.9 ± 5.5	32.1 ± 5.2	32.0 ± 5.7	30.0 ± 7.9	0.586			
Treatment Perception Questionnaire								

	All SAC participants N=124	G1 N=89	G2 N=27	G3 N = 8	p^a	P G1-G2	P G2-G3	P G1-G3
Variables	mean \pm s.d. / N (%)	mean \pm s.d. / N (%)	mean \pm s.d. / N (%)	mean \pm s.d. / N (%)				
<i>Total</i>	27.8 \pm 4.8	27.4 \pm 4.4	28.9 \pm 6.1	27.4 \pm 3.4	0.379			
<i>Staff perceptions</i>	13.8 \pm 3.0	13.7 \pm 2.9	14.3 \pm 3.6	13.1 \pm 2.5	0.493			
<i>Programme perceptions</i>	14.0 \pm 2.7	13.8 \pm 2.5	14.6 \pm 3.3	14.3 \pm 2.0	0.391			

HA = Hospital Authority

G1= Retention Group

G2 = Dropout Group

G3 = PRN (Pro re nata) Group

^a ANOVA unless otherwise specified

^b Chi square test

Face-To-Face Interview

Fifteen participants remained in the study [Figure 1]. Scores on the SDS ($p=0.021$) and the ASI composite score for the drug subscale ($p=0.019$) had improved a year after the treatment. However, scores on the ASI employment subscale ($p<0.001$), the psychiatric subscale ($p=0.015$), and SCORATES 8D Ambivalence subscale ($p=0.002$) had deteriorated [Table 9]. Participants' mean scores on the cognitive assessments are shown in Table 10. Attention ($p<0.001$) and visuomotor speed ($p=0.002$) had improved significantly, but executive functioning ($p=0.046$) and working memory ($p=0.006$) had deteriorated significantly [Table 10].

Table 9. Participants' scores on self-report items at baseline and one-year follow-up, N=15

	Baseline	One-year follow-up	P^a
Measures	Mean \pm s.d.	Mean \pm s.d.	
Beck Depression Inventory	13.5 \pm 9.4	11.5 \pm 7.4	0.001
Anxiety subscale of the Hospital Anxiety and Depression Scale	10.3 \pm 5.5	8.73 \pm 5.3	0.005
Severity of Dependence Scale	8.14 \pm 4.5	6.3 \pm 4.7	0.021
SCORATES 8D			
<i>Recognition</i>	26.5 \pm 4.4	27.1 \pm 4.2	0.290
<i>Ambivalence</i>	13.7 \pm 3.0	13.1 \pm 3.1	0.002
<i>Taking Steps</i>	32.9 \pm 4.5	30.3 \pm 6.3	0.257
Treatment Perception Questionnaire			
<i>Total</i>	28.1 \pm 2.8	29.2 \pm 4.1	0.409
<i>Staff perceptions</i>	14.4 \pm 1.8	14.5 \pm 3.2	0.285
<i>Programme perceptions</i>	13.0 \pm 3.8	14.7 \pm 2.4	0.339
ASI composite score			
<i>Medical</i>	0.43 \pm 0.46	0.17 \pm 0.31	0.797
<i>Employment</i>	0.18 \pm 0.13	0.09 \pm 0.06	<0.001
<i>Alcohol</i>	0.02 \pm 0.01	0.37 \pm 0.14	0.435
<i>Drug</i>	0.14 \pm 0.09	0.09 \pm 0.10	0.019
<i>Legal</i>	-	-	-
<i>Family</i>	0.34 \pm 0.24	0.60 \pm 0.16	0.160
<i>Psychiatric</i>	0.48 \pm 0.24	0.51 \pm 0.32	0.015

SCORATES 8D = Version 8 Stages of Change Readiness and Treatment Eagerness Scale;

ASI= Addiction Severity Index

^aPaired-sample t-test between baseline and one-year follow-up measures

Table 10. Participants' cognitive performance at baseline and one-year follow-up, N=15.

		Baseline	One-year follow-up	P^a
Cognitive domains	Cognitive tests	mean ± s.d.	mean ± s.d.	
Executive functioning	Frontal assessment Battery	16.4 ± 2.0	15.8 ± 2.0	0.046
Attention	Digit Span Forward	10.9 ± 1.8	11.4 ± 1.4	<0.001
Working Memory	Digit Span Backward	6.4 ± 1.9	4.9 ± 2.4	0.006
Language	Verbal Fluency (Animals)	14.7 ± 3.3	13.3 ± 4.7	0.252
	Modified Boston Naming Test	14.6 ± 1.1	14.5 ± 0.7	0.128
Verbal Memory	Story Recall (Story A) (Immediate Recall-LMI)	5.6 ± 2.1	4.2 ± 2.8	0.157
	Story Recall (Story A) (Delayed Recall-LMII)	5.9 ± 2.6	4.4 ± 2.6	0.183
Visual Memory	Picture Recall (Immediate Recall)	6.0 ± 1.5	6.4 ± 1.2	0.087
	Picture Recall (Delayed Recall)	4.7 ± 1.7	5.3 ± 1.7	0.653
	Picture Recall (Delayed Recognition)	18.1 ± 1.7	18.3 ± 1.9	0.069
Visuoconstruction	Clock Drawing Test	4.7 ± 0.8	4.1 ± 1.3	0.535
Visuomotor Speed	Digit Cancellation Task	32.6 ± 7.3	35.1 ± 4.4	0.002

^aPaired-sample t-test between baseline and one-year follow-up measures

Two-Year Follow-Up

Case Note Reviews

Baseline and clinical characteristics and treatment modality of participants

Forty-four sets of case notes were reviewed for the two-year follow-up between June 2010 and April 2011 [Figure 1]. Twenty-nine patients remained in the SAC treatment, six had discontinued treatment and nine were considered to be PRN cases by the psychiatrists. The baseline socio-demographic characteristics and psychiatric diagnoses of the participants are depicted in Tables 11 & 12. Patients' treatment progress during the second year of treatment is summarized in Table 13. A mean of 7.9 ± 4.6 medical appointments were made for the SAC patients and their mean adherence was 70.5%. Only 70.5% of participants received medicine treatment; antidepressants (43.2%) were the most commonly prescribed medicine, followed by antipsychotics (34.1%) [Table 13]. Laboratory investigations were carried out on 95.5% of the participants; 93.2% had a urine drug screening test, 61.4% an electrolytes test, 50.0% a complete blood picture, 45.5% a thyroid function test, 43.2% a glucose level test, 34.1% a lipids test, 22.7% a liver function test, 11.4% a hepatitis status test, 9.1% a clotting profile, and 2.3% a sexually transmitted disease test.

Comparison between the retention and dropout group

Participants in the three groups did not differ in their psychiatric diagnoses [Table 12]; however, there was a significant difference in the severity of anxiety symptoms between the dropout and PRN groups ($p=0.018$). The dropout group also showed a significantly lower total score for treatment perception than the PRN group ($p=0.046$) [Table 11].

As expected, there was a significant difference between the groups in terms of the total number of appointments offered ($p=0.040$), attended ($p=0.008$) and missed ($p=0.046$), and in adherence to treatment ($p=0.004$). Differences were found in the type of medication between dropout and retention groups: benzodiazepines ($p=0.048$), other hypnotics ($p=0.053$), antidepressants ($p=0.070$), mood stabilizers ($p=0.071$), and antipsychotics ($p=0.082$) [Table 13].

Table 11. Baseline characteristics of patients at two-year follow-up.

	All SAC participants N = 44	G1 N=29	G2 N=6	G3 N = 9	p ^a	P G1- G2	P G2- G3	P G1- G3
	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)				

	All SAC participants N = 44	G1 N=29	G2 N=6	G3 N = 9	p^a	P G1- G2	P G2- G3	P G1- G3
	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)				
Baseline characteristics								
Sex (male)	27 (61.4)	17 (58.6)	5 (83.3)	5 (55.6)	0.486 ^b			
Age (years)	31.9 \pm 11.9	33.2 \pm 11.7	32.3 \pm 13.1	27.7 \pm 12.0	0.486			
Education (years)	8.4 \pm 2.9	8.5 \pm 3.2	8.2 \pm 2.6	8.4 \pm 2.2	0.972			
Criminal record (yes)	26 (59.1)	17 (58.6)	5 (83.3)	4 (44.4)	0.323 ^b			
Age of onset (substance use)	21.4 \pm 7.542	21.7 \pm 7.8	21.3 \pm 6.4	20.3 \pm 8.1	0.885			
<i>Alcohol use (social/heavy drinker)</i>	19.6 \pm 7.6	19.6 \pm 8.5	16.5 \pm 5.0	21.7 \pm 6.7	0.784			
<i>Drug use</i>	22.9 \pm 8.5	23.9 \pm 9.1	21.8 \pm 6.3	20.5 \pm 7.9	0.547			
Duration of substance use (years)	10.6 \pm 9.6	11.5 \pm 10.5	11.0 \pm 9.5	7.4 \pm 6.3	0.548			
<i>Alcohol use (social/heavy drinker)</i>	3.8 \pm 7.7	4.8 \pm 9.2	2.3 \pm 3.7	1.4 \pm 2.2	0.480			
<i>Drug use</i>	9.0 \pm 8.4	9.3 \pm 8.9	10.5 \pm 9.7	7.2 \pm 6.5	0.739			
Beck Depression Inventory	15.3 \pm 8.3	15.2 \pm 9.3	13.8 \pm 7.8	16.3 \pm 5.5	0.855			
Beck Depression Inventory (\geq cutoff point 13)	28 (63.6)	18 (62.1)	3 (50.0)	7 (77.8)	0.524			
Anxiety Subscale of the Hospital Anxiety and Depression Scale Score	11.1 \pm 5.2	10.9 \pm 5.4	8.7 \pm 6.2	13.2 \pm 3.6	0.248			
Anxiety Subscale of the Hospital Anxiety and Depression Scale (\geq cutoff point 8)	32 (72.7)	20 (69.0)	3 (50.0)	9 (100)	0.076	0.373	0.018	0.056
Severity of Dependence Scale	8.4 \pm 4.2	8.5 \pm 4.3	8.7 \pm 3.1	8.0 \pm 4.8	0.941			
SCORATES 8D								
<i>Recognition</i>	27.9 \pm 4.8	27.7 \pm 4.2	27.5 \pm 4.6	29.1 \pm 6.9	0.718			
<i>Ambivalence</i>	14.8 \pm 2.9	14.9 \pm 2.7	14.3 \pm 2.6	14.8 \pm 4.1	0.905			
<i>Taking Steps</i>	32.2 \pm 5.3	32.5 \pm 4.6	32.8 \pm 5.2	30.6 \pm 7.5	0.598			
Treatment Perception Questionnaire								
<i>Total</i>	27.2 \pm 4.2	26.9 \pm 4.4	24.7 \pm 3.2	29.9 \pm 2.8	0.047	0.437	0.046	0.136
<i>Staff perceptions</i>	13.7 \pm 2.8	13.9 \pm 2.9	11.3 \pm 2.5	14.6 \pm 2.1	0.077			
<i>Programme perceptions</i>	13.6 \pm 2.5	13.0 \pm 2.6	13.3 \pm 2.0	15.3 \pm 1.8	0.055			
ASI composite score								
<i>Medical</i>	0.3 \pm 0.4	0.3 \pm 0.4	0.2 \pm 0.2	0.3 \pm 0.4	0.836			
<i>Employment</i>	0.7 \pm 0.3	0.6 \pm 0.3	0.9 \pm 0.0	0.6 \pm 0.3	0.719			

	All SAC participants N = 44	G1 N=29	G2 N=6	G3 N = 9	p ^a	P G1- G2	P G2- G3	P G1- G3
	Mean ± s.d/ N (%)	Mean ± s.d/ N (%)	Mean ± s.d/ N (%)	Mean ± s.d/ N (%)				
<i>Alcohol</i>	0.1 ± 0.2	0.1 ± 0.2	0.1 ± 0.1	0.2 ± 0.2	0.755			
<i>Drug</i>	0.2 ± 1.0	0.2 ± 0.1	0.2 ± 0.1	0.2 ± 0.1	0.708			
<i>Legal</i>	-	-	-	-	-			
<i>Family</i>	0.3 ± 0.2	0.4 ± 0.2	0.3 ± 0.3	0.3 ± 0.5	0.786			
<i>Psychiatry</i>	0.5 ± 0.2	0.5 ± 0.2	0.4 ± 0.2	0.4 ± 0.2	0.284			

* Participants who remained in the 1-year SAC treatment programme and were eligible for the 2-year case note review

G1= Retention Group

G2 = Dropout Group

G3 = PRN (Pro re nata) Group

SCORATES 8D= Version 8 Stages of Change Readiness and Treatment Eagerness Scale;

ASI= Addiction Severity Index

^a independent t-test between 2-year retention and dropout group

^b crosstab between 2-year retention and dropout group

Table 12. Frequency of psychiatric diagnoses in patients who remained in the SAC in the second year of treatment.

Psychiatric diagnoses	All SAC participants N=44	G1 N=29	G2 N=6	G3 N = 9	P ^a
	Mean ± s.d/ N (%)	Mean ± s.d/ N (%)	Mean ± s.d/ N (%)	Mean ± s.d/ N (%)	
All diagnoses	23 (52.3)	14 (48.3)	5 (83.3)	4 (44.4)	0.256
Psychosis	17 (38.6)	9 (31.0)	4 (66.7)	4 (44.4)	0.244
<i>Substance-induced psychotic disorder</i>	10 (22.7)	4 (13.8)	3 (50.0)	3 (33.3)	0.109
<i>Schizophrenia</i>	3 (6.8)	2 (6.9)	0	1 (11.1)	0.705
<i>Psychosis</i>	7 (15.9)	4 (13.8)	2 (33.3)	1 (11.1)	0.446
Depression	5 (11.4)	5 (17.2)	0	0	0.232
<i>Depressive episode</i>	4 (9.1)	4 (13.8)	0	0	0.320
<i>Dysthymia</i>	1 (2.3)	1 (3.4)	0	0	0.767
Bipolar affective disorder	1 (2.3)	1 (3.4)	0	0	0.767
Acute stress disorder	1 (2.3)	1 (3.4)	0	0	0.767
Adjustment disorder	2 (4.5)	2 (6.9)	0	0	0.582
Personality Disorder	2 (4.5)	2 (6.9)	0	0	0.582

Psychiatric diagnoses	All SAC participants N=44	G1 N=29	G2 N=6	G3 N = 9	P^a
	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	
Others	3 (6.8)	2 (6.9)	1 (16.7)	0	0.455
Insomnia	1 (2.3)	1 (3.4)	0	0	0.767

G1= Retention Group

G2 = Dropout Group

G3 = PRN (Pro re nata) Group

^a Chi square test

Table 13. Second year of SAC treatment modality*

	All SAC participants N = 44	G1 N=29	G2 N=6	G3 N=9	P^a	P G1-G2	P G2-G3	P G1-G3
	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)	Mean \pm s.d/ N (%)				
Number of medical appointments offered	7.9 \pm 4.6	8.6 \pm 4.4	7.0 \pm 4.0	0.5 \pm 0.7	0.040	0.679	0.166	0.036
Number of medical appointments attended	5.6 \pm 3.9	6.6 \pm 3.7	2.5 \pm 2.5	0.5 \pm 0.7	0.008	0.036	0.764	0.059
Number of medical appointments defaulted	2.3 \pm 2.7	2.0 \pm 2.6	4.5 \pm 2.2	0	0.046	0.079	0.088	0.542
Adherence (%)#	70.5 \pm 30.0	78.3 \pm 22.8	28.3 \pm 27.0	100.0 \pm 0.0	<0.001	<0.001	0.356	0.057
Plan of management (weeks)	7.4 \pm 4.7	7.9 \pm 4.9	3.8 \pm 1.3	7.0 \pm 0.0	0.257			
All prescriptions	31 (70.5)	26 (89.7)	4 (80.0)	1 (11.1)	<0.001 ^b	0.143	0.025	<0.001
<i>Antidepressants</i>	19 (43.2)	16 (55.2)	2 (33.3)	1 (11.1)	<0.001 ^b	0.070	0.014	<0.001
<i>Antipsychotics</i>	15 (34.1)	13 (44.8)	2 (33.3)	0 (0)	<0.001 ^b	0.082	0.017	<0.001
<i>Benzodiazepines</i>	6 (13.6)	6 (20.7)	0 (0)	0 (0)	<0.001 ^b	0.048	0.005	<0.001
<i>Others hypnotics</i>	5 (11.4)	5 (17.2)	0 (0)	0 (0)	<0.001 ^b	0.053	0.005	<0.001

<i>Mood stabilizers</i>	2 (4.5)	2 (6.9)	0 (0)	0 (0)	<0.001 ^b	0.071	0.005	<0.001
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* Participants who remained in the 1-year SAC treatment programme and were eligible for the 2-year case note review

G1= Retention Group

G2 = Dropout Group

G3 = PRN (Pro re nata) Group

^a independent t-test between 2-year retention and dropout group

^b crosstab between 2-year retention and dropout group

#Adherence equals the number of attended appointments divided by the total number of appointments made during the treatment period times 100.

Comparison between the first and the second year of SAC treatment

Compared to the first year of treatment, fewer medical appointments were arranged ($p < 0.001$) or attended ($p < 0.001$), whereas more appointments were defaulted ($p < 0.001$). In addition, fewer patients underwent investigations ($p < 0.001$), especially urine testing for drug screening ($p < 0.001$), lipid profiles ($p = 0.002$), thyroid function test ($P = 0.003$), and plasma glucose test ($p = 0.011$) [Table 14].

Table 14. Services received by SAC patients in the first and second years of treatment (N = 44)

	First year	Second year	p
Number of medical appointments	8.74 ± 3.96	7.90 ± 4.93	< 0.001
Number of appointment attended	6.95 ± 3.79	5.05 ± 3.97	< 0.001
Number of appointment defaulted	1.79 ± 2.48	2.79 ± 3.50	< 0.001
All prescriptions	38 (86.4)	31 (70.5)	0.070
<i>Antidepressants</i>	17 (48.6)	19 (54.3)	0.435
<i>Antipsychotics</i>	16 (45.7)	15 (42.9)	0.666
<i>Benzodiazepines</i>	9 (25.7)	6 (17.1)	0.540
<i>Others hypnotics</i>	8 (22.9)	5 (14.3)	0.643
<i>Mood stabilizers</i>	4 (11.4)	2 (5.7)	0.574
All investigations	42 (95.5)	30 (68.2)	0.001
<i>Urine for drug screening</i>	41 (93.2)	24 (54.5)	< 0.001
<i>Electrolytes test</i>	27 (61.4)	20 (45.5)	0.135
<i>Complete blood picture</i>	22 (50.0)	16 (36.4)	0.197
<i>Thyroid function test</i>	20 (45.5)	7 (15.9)	0.003
<i>Plasma glucose test</i>	19 (43.2)	8 (18.2)	0.011
<i>Lipid profiles</i>	15 (34.1)	3 (6.8)	0.002
<i>Liver function test</i>	10 (22.7)	6 (13.6)	0.269
<i>Heptatitis</i>	5 (11.4)	1 (2.3)	0.091

	First year	Second year	p
<i>Clotting profiles</i>	4 (9.1)	5 (11.4)	0.725
<i>Sexually transmitted diseases</i>	1 (2.3)	1 (2.3)	1.000

Face-To-Face Interview

All of the participants refused to be interviewed or could not be traced so no face-to-face interviews were conducted at this stage.

Discussion

General Characteristics of the Study Sample

The characteristics of the participants were roughly in line with the overall situation in Hong Kong reported elsewhere (Central Registry of Drug Abuse Fifty-ninth Report, 2000-2009; Tang et al., 2011). Among the category of psychotropic substances, ketamine was top of the list; the numbers of Midazolam/Nimetazepam/Zopiclone/Imovane and amphetamine/ice abusers were more or less the same and were ranked second and third, followed by cough medicine. The same pattern was shown in participants' self-reports. However, the substance use pattern was slightly different from the urinalysis. Detection of the use of cough medicine was more frequent than the use of Midazolam/Nimetazepam/Zopiclone/Imovane and amphetamine/ice. The positive rates for cough medicine, benzodiazepines, methadone and opiates were also much higher than for self-reported lifetime use. A partial explanation for this may lie in the fact that participants who abuse cough medicine, benzodiazepines, methadone, and opiates might tend to deny the use of drugs.

In general, the participants considered the extent of the problem caused by their current substance misuse and the importance of treatment as moderate to considerable. They also tended to deny and did not recognize that their substance use was causing them serious problems and they did not express a desire to change, which is similar to Gossop's (1982) finding. Moreover, according to their self-report and urine analysis, they were uncertain whether they were in control and had not made any changes with regard to their current drug misuse. Participants were not satisfied with the treatment programme at their first visit. Furthermore, more than 50% of the participants were at risk for depression and anxiety disorders; this implies that they were not emotionally stable, which in turn may have acted as a barrier to attending the treatment sessions. Consequently, this may have influenced the later treatment success rate; i.e., the percentage of patients who remained in the treatment (Compton et al., 2000; Hasin et al., 2002; Peters et al., 2004; Wyman et al., 2011). The participants' scores on the SCORATES 8D also suggest that they had little insight and were resistant to changing their drug misuse problem, which is similar to the pattern found in Gossop (1982).

The current study showed a lower degree of substance dependence by SDS than that found by Moselhy et al. (2010) (7.0 vs. 11.7), although the choice of sampling method may account for the difference. In Moselhy et al. (2010), participants were mainly opioid abusers, whereas the current study focused on several substances. Different substances produce different adverse effects, which consequently alter the degree of dependence among abusers. In comparison with Wu et al. (2011), the legal, family and psychiatric dimensions of the ASI in the current study were more severe, whereas employment and drug problems were less severe; the number of medical problems was similar. These differences in severity are likely to rest on the treatment setting. Inpatient facilities tend to specialize in treating abusers with more severe drug, medical and psychiatric problems, and hospitalized patients accounted for 33% of the sample in Wu et al. (2011). Moreover, hospitalized patients are not allowed to leave the hospital except under medical advice, thus they are usually unemployed, have a lower risk of committing

a crime and have a more stable psychiatric condition. A stable mental condition is likely to result in less conflict with others and better social relationships.

The mean BDI score in the study sample was 13.5, and 54.5% of the study sample had significant depressive symptoms. A study of adolescent cannabis users showed a lower mean score of 10.8, although 91% of participants were screened with mild or severe level of depressive symptoms (Dorard et al., 2008). Although no consistent results have been found in other studies using the original 21-item BDI, with scores ranging from 5.79 to 15.22 (Eaton et al., 1995; Sayre et al., 2002; Singh & Cameron, 2005), there is clear evidence that depressive symptoms predict poor treatment response and a higher rate of relapse (Compton, et al., 2000; Hasin, et al., 2002; Williams, 1992).

The mean HADS score was also found to be higher than the optimal cutoff point of 8 (Olsson et al., 2005), indicating that participants were at higher risk for being classified as suffering from anxiety disorders. Significant anxiety symptoms were reported by 69.7% of participants compared with 48% found elsewhere (Charney et al., 2005). Anxiety disorders are theorized to be associated with substance abuse (Peterlin et al., 2011; Wyman, et al., 2011). Kessler et al. (1995) indicated that individuals suffering from PTSD were at greater risk for drug and alcohol use than those without PTSD. To summarize, individuals with high levels of anxiety or depressive symptoms are at risk for substance use, and vice versa (Kranzler & Tinsley, 2004; Regier et al., 1990).

The neuropsychological findings indicated that participants were impaired in verbal fluency compared to their counterparts who had no history of drug use. The current sample scored considerably lower than the control group reported by van Beilen et al. (2004) (13.79 vs. 26.24) when instructed to generate as many animal names as possible in one minute. In this case, participants appeared to have damage to the frontal and/or temporal lobes due to the adverse effects of drug use, although there is no solid evidence from brain imaging to support the neurological pathology in the current study. Apart from the neurological aspect, poor category fluency may also arise from other executive function deficits. The generation of a certain category of words involves several skills, such as memory search strategies, organizational strategies and long-term memory (Rosser & Hodges, 1994; Ruff et al., 1997). Thus, individuals with impaired verbal fluency also tend to perform poorly in daily functions that require the use of organization and memory, such as the initiation of appropriate actions, planning and abstract thinking. Cognitive impairment has been reported amongst chronic ketamine users (Morgan et al., 2009), who scored lower on spatial working memory and pattern recognition tests one year after increasing their dose of ketamine.

One-Year Treatment and Outcome

Medical Treatment and Other Allied Health Care Services in the First Year of Treatment

Seventy-two percent of SAC patients received pharmacological treatment and the referral rate to allied health care services was 25%. The BEACH (Bettering the Evaluation and Care of Health) programme in Australia reported 81.3% and 7.7% for medication and referral rate, respectively (Charles et al., 2010). The remarkable discrepancy in referral rates may be due to the types of health service provided. The allied health services

provided in the SAC include occupational therapy, medical social services and clinical psychology services, whereas the BEACH programme offers drug and alcohol services, and psychology and counselling services. Psychiatrists only initiate health care services for patients who are found to have occupational-related problems, benefit/social problems, or other psychological problems that require non-medication treatment. The small number of referrals might also suggest that patients' problems can generally be eased by medication. Alternatively, patients with lower insight may not accept a referral even if it is offered by a psychiatrist. It is also important to note that the records only include those who had accepted and attended the services; patients who declined were not noted. Last but not least, although 3% of patients did not receive any medication or referral, this does not suggest a service gap in the clinic. Some drug abusers who sought help from the SAC might have suffered from sub-clinical psychiatric symptoms; as a result, they would not be prescribed any medicine or referred to other services but advised for further appointments with a psychiatrist.

Factors Associated with Discontinuation of SAC Treatment

Twenty-two percent of the SAC patients dropped out of the treatment within the first year. However, it is difficult to compare the rate with other studies due to methodological differences in defining "dropout" and "retention". Despite such methodological differences, an average dropout rate of 58% has been reported in other outpatient programmes (Gainey et al., 1993; Greenfield et al., 2007; Laudet et al., 2009; Sayre, et al., 2002). Sayre et al. (2002) found that 49% of participants dropped out during the first 10 sessions and only 35% completed the 20 sessions of the treatment programme. It is clear that poor adherence to treatment leads to poor outcome. Poor adherence to treatment is associated with poor psychosocial outcomes, such as higher unemployment and arrest rates (Stark, 1992). Possible factors for treatment discontinuation can be classified into two levels: programme/organization-level and individual-level factors (Laudet, et al., 2009). The programme level includes the characteristics of the treatment system, such as availability and technology. The individual level includes the personal characteristics of patients, including predisposing factors, treatment needs and enabling factors.

At the individual level, no significant differences in predisposing characteristics (e.g., socioeconomic status) were found between the retention and dropout groups. The number of participants who had a psychiatric diagnosis was not statistically different between groups at one-year follow-up. This result implies that the clinical need for treatment does not predict engagement with treatment, although consistent findings have not been reported for the relationship between problem severity and treatment engagement (Roberts & Nishimoto, 1996; Stark, 1992). Patients' perception of need might be different from the advice of clinicians; patients may feel better and decide to stop attending appointments even though they are still clinically unstable. Moreover, at the programme level, the current result is not in line with previous studies, which found that higher satisfaction with the programme and staff was positively correlated with treatment adherence at 12-month follow-up (Ball et al., 2006; Claus & Kindleberger, 2002).

The current result also suggests that substance abusers with psychosis are more likely to remain in treatment than those with other psychiatric diagnoses. There is

evidence that treating psychosis can improve treatment adherence (Ruiz et al., 2007). This might also be partially explained by the fact that substance abusers considered psychosis as a more troubling co-occurring mental disorder, and their problematic substance misuse may be due to the adverse effects of psychosis; a strong association between psychosis and substance use disorder was evidenced in Lambert et al. (2005)

The PRN group was the most stable group. This group had better employment status, lower levels of depressive symptoms and lower ambivalence scores, indicating a better insight into their physical and mental health.

The improvement in drug and employment problems may contribute to the efficiency of treatment programmes provided by SACs or CCPSAs. The deterioration in working memory and the modest decline in other domains of cognitive ability over the 12-month period can be partly explained by the use of medicines that have an adverse effect on cognitive functioning (Beracochea, 2006; Silver & Feldman, 2005), or may simply be the consequence of continued substance abuse.

Two-Year Treatment and Outcome

Medication and Other Allied Health Care Services in the Second Year of Treatment

In general, the treatment in the second year was less intensive, as reflected by the decrease in the number of appointments offered, medication prescribed and investigations ordered by the psychiatrist in the second year. This may be because patients improved during the first year of treatment, thus intensive treatment was no longer necessary.

Factors Associated with Discontinuation of SAC Treatment

Seventy-one percent of patients received pharmacotherapy during the second year of treatment, with no difference between groups. Nonetheless, the types of prescribed medicine differed significantly between groups. In the dropout group, minimal prescriptions from the treating psychiatrists might have led patients to believe that their condition was stable and thus they might have terminated their treatment prematurely. It is possible that patients expect medication treatment and are likely to discontinue the treatment when the psychiatrists no longer prescribe certain types of medicine, especially benzodiazepines. Benzodiazepines are prescribed for those who suffer from sleep problems and/or anxiety, but they can also cause dependence and are liable to be abused. The association between dropout and prescription of benzodiazepines may have been due to two reasons: first, patients may not have been getting the medicine they desired; and second, it may well be that patients considered themselves to be well-adjusted and relatively satisfied with their lives and no longer experienced poor sleep or anxiety, thus they were unlikely to continue the treatment.

Conclusion

In conclusion, ketamine (59.3%) and amphetamine (33.1%) were the most commonly abused drugs in the study sample. The most common psychiatric disorder was psychosis (37.1%), of which 76.1% was substance-induced psychotic disorder. The retention rates for the first and the second year of SAC treatment were 71.8% and 23.4%, respectively. The possible factors influencing treatment dropout included suffering from psychosis and the type of medicine, especially benzodiazepines, prescribed by the psychiatrist. During the study period, more than 70% of SAC patients received medication during the first and the second year of treatment, and 25% received a referral to other allied health services. Antipsychotics and antidepressants accounted for 39.5% and 36.3% of prescriptions, respectively. As most of the participants dropped out of the study, the case note review was not sufficient for measuring treatment outcome. Thus, in future studies, the SACs and other service providers should use a standardized outcome measure such as the Christo Inventory for Substance-Misuse Services.

Limitations

The main limitation of the current study is that most participants declined to be interviewed again, and thus treatment outcome could not be measured by comparing differences in the level of substance abuse and other sociopsychological status of participants. A dropout rate of approximately 90% was found in the current study, which may be explained by a number of reasons. First, data collection was conducted on the day that patients turned up for their appointments, which were on working weekdays. Although 61% of the sample reported being unemployed during the baseline measure, participants may have been able to find a part- or full-time job once they were emotionally and/or physically stable. Rushing to work could explain why they refused to be interviewed again. Besides, participation in the current study was entirely voluntary and did not affect their current or future treatment. After their first experience, they might have considered the helpfulness of participating in the study for their conditions. Moreover, patients who dropped out of treatment could not be traced for interview. Last but not least, follow-up appointments were only deemed necessary for incarcerated patients with psychotic symptoms, and for security reasons these patients were not invited for interview.

The CMS only provided the medical record and treatment modality that patients received, with no record of the severity of different aspects of their condition. In future studies, a uniform simple outcome measure should also be used, such as the Christo Inventory for Substance-Misuse Services (CISS) (Christo et al., 2000).

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