INTRODUCTION

Retention in treatment is very important for successful outcomes in the management of substance use disorders. Patients with substance use disorders have been found to have significant drop-out rates. Drop-out from treatment in-turn leads to poor prognosis and recurrent relapses. Many factors have been associated with drop-out among patients seeking treatment for substance use disorders. Some of the demographic factors associated with drop-out status include age, employment status, and educational status. Other factors that have been implicated in retention in treatment include presence of a psychiatric disorder, motivation for treatment, and cognitive characteristics of the client. Mitchell and Selmes have reviewed these factors, and a comprehensive list of predictors of retention in treatment in a tertiary care de-addiction center has been developed.
There is a relative paucity of published literature about factors predicting retention of treatment among substance users in India. Selected studies are available about treatment retention among substance abusers. With the relative lack of published literature, this study attempted to find out the predictors of retention in a substance use treatment setting.

**MATERIALS AND METHODS**

The present chart-based study was conducted at a tertiary level de-addiction center. The center provides treatment services to patients with a variety of substance use disorders. Apart from that, the center is also involved in teaching of health care personnel and trainers about substance use disorder and their management. The center is also actively involved in research activities, ranging from biological, epidemiological, and therapeutic to service-based research.

The therapeutic services provided by the center include both inpatient and outpatient services. The clientele of the center primarily comprises of patients with opioid and alcohol use disorders, though the center also encounters patients with disorders of other substances of use. Patients either seek treatment directly or are referred from elsewhere. Patients are often accompanied by their family members. Inpatient stay is usually for less than a month’s time, focusing initially on detoxification. Both pharmacological and nonpharmacological approaches for treatment are available and used. Patients are started on prophylactic medications (such as naltrexone, acamprosate for alcohol dependence syndrome) or maintenance doses of opioid agonists after detoxification (for opioid dependence syndrome) during an inpatient stay, and are followed up subsequently on an outpatient basis. During each visit, the progress and abstinence status of the patient are recorded by the clinicians in the charts kept at the center.

This chart-based record review study was conducted consecutively among patients who were admitted in the center over a period of 1 year. Information was extracted from the records by one of the authors (PM) using a predetermined questionnaire. Information was gathered about demographic and clinical details. Assessment of various physical, psychological, and social complications were also done to see whether complications are accruing due to substance use lead to poor retention in treatment. Predetermined criteria were used for coding purposes. Information was collected from the case records as they were. In the case of doubt, consultation was made to other authors for clarification. Retention in treatment was defined as regular follow-up (>80% of the time) irrespective of abstinence status during the first 3 months after discharge.

The analysis was performed using SPSS version 17 (SPSS Inc., Chicago). The sample was divided into retained in treatment and dropped out. Descriptive statistics in the form of mean, standard deviations, frequencies, and percentages were used to represent the variables studied. The two groups (retained in treatment and dropped out) were compared across the variables using appropriate parametric and nonparametric tests. Chi-square ($\chi^2$) and Fisher’s exact test were used for nominal data while Student’s t-test was used for continuous data when distributions were normal and Mann–Whitney U-test for nonnormal distribution. Multivariate logistic regression analysis was conducted to find the predictors of retention into treatment. All the tests were two-tailed, and a value $P < 0.05$ was considered statistically significant.

**RESULTS**

The present record review based study was based on the information obtained from case files of 88 patients. Of them, 40 (45.4%) were retained in treatment, and 48 (54.6%) dropped out. All the patients were males. The characteristics of patients who were retained in treatment and those who dropped out are shown in Table 1.

The clinical details of the patients are shown in Table 2. The majority of the patients were opioid users, followed by alcohol and cannabis users. A lower proportion of patients with high-risk sexual behavior were retained in treatment (22.5% vs. 39.7%).

The complications of substance use that affected at least 5% of the study sample are depicted in Table 3. Individually,
Retained
(n=40)

Dropped out
(n=48)

Comparison
(P)

Table 1: Characteristics of patients retained treatment and those dropped out

| Variable                                      | Retained | Dropped out | Comparison |
|-----------------------------------------------|----------|-------------|------------|
| Age (in years)                                | 35.9±9.7 | 34.0±9.3    | t=0.900 (0.371) |
| Marital status                                |          |             |            |
| Married                                       | 29       | 29          | χ²=1.418 (0.234) |
| Not married                                   | 11       | 19          |           |
| Education                                     |          |             |            |
| Up to 10th grade                              | 33       | 37          | χ²=0.393 (0.530) |
| Above 10th grade                              | 7        | 11          |           |
| Occupation                                    |          |             |            |
| Employed                                      | 29       | 26          | χ²=3.129 (0.077) |
| Not employed                                  | 11       | 22          |           |
| Family                                        |          |             |            |
| Nuclear                                       | 29       | 32          | χ²=0.349 (0.555) |
| Others                                        | 11       | 16          |           |
| Background                                    |          |             |            |
| Urban                                         | 31       | 35          | χ²=0.244 (0.621) |
| Rural                                         | 9        | 13          |           |
| Socioeconomic status                          |          |             |            |
| Upper                                         | 2        | 1           | χ²=4.844 (0.089) |
| Middle                                        | 16       | 10          |           |
| Lower                                         | 22       | 37          |           |

Shown as frequency or mean (±SD). SD – Standard deviation

Table 2: Clinical details of the patients retained treatment and those dropped out

| Variable                                      | Retained (n=40) | Dropped out (n=48) | Comparison (P) |
|-----------------------------------------------|-----------------|--------------------|----------------|
| Substances being used at admission*           |                 |                    |                |
| Alcohol                                       | 8               | 9                  | χ²=0.022 (0.882) |
| Opioids                                       | 38              | 47                 | χ²=0.564 (0.589) |
| Cannabis                                      | 9               | 7                  | χ²=0.919 (0.338) |
| Sedative-hypnotics                            | 6               | 4                  | χ²=0.963 (0.502) |
| Duration of substance use (in years)          | 13.3±8.0        | 12.1±8.4           | t=0.659 (0.512) |
| Number of abstinent attempts (>1 month) in the past | 1.7±2.4        | 2.6±4.9            | t=1.097 (0.276) |
| Medical co-morbidity                          | 8               | 8                  | χ²=0.186 (0.686) |
| Family history of substance use except tobacco| 10              | 5                  | χ²=3.282 (0.070) |

Shown as frequency or mean (±SD) *Many subjects used more than one substance. SD – Standard deviation

guilt feelings, general weakness of the body, and loss of social respect were the most common substance-related complications experienced.

The logistic regression showed that being from a higher socio-economic status (β = −0.860, P = 0.052) and having a family history of substance use (β = −1.344, P = 0.041) were associated with retention into treatment. Put in other words, having one grade of higher socioeconomic status reduced the chance of drop-out by 57.7%, and having a family member with substance use reduced the chance of drop-out by 73.9%, keeping the other variables constant. The model explained 14.4% of the variance (Nagelkerke R² = 0.144).

DISCUSSION

This study was conducted among substance users who were admitted for treatment. The entire sample comprising of males is in line with the previous literature of inpatient substance users from India, which suggests that majority of treatment seekers are males.[13,14] The other demographic characteristics are also representative of treatment seekers in a government setting. A large proportion of substance users seeking treatment were from middle and lower socioeconomic status, as the services provided were highly subsidized, and the medications are dispensed practically free of cost.

The study was able to evaluate the various physical and psychosocial complications that could occur as a consequence of substance abuse. Substantial numbers of patients had difficulties in familial, social, financial, and occupational domains, but did not differ much between those retained in treatment and those who dropped out. Insomnia as a complaint was present more frequently among drop-outs, though at a trend level significance, suggesting that aggressive treatment of sleep complaints might cater to patient’s needs and help them retain in the treatment.
A higher socioeconomic status and having a family member with substance use were associated with treatment retention in this study. Socioeconomic status might relate to better means to afford travel expenses and other incidentals that are required for regular follow-up in substance use treatment. Elsewhere, it has been seen that higher expenses from the patient for treatment increases the chances of patient drop-out and recurrence of illness.\[15\] Another study points toward higher socioeconomic status being a predictor of good treatment retention and outcome.\[16\] However, there is evidence to the contrary that socioeconomic status might not influence retention in treatment of substance use disorder.\[17\] A previous study from a community-based treatment center in the country reported a shift in residence and being incarcerated as the common reasons for treatment drop-out.\[18\]

Having a family member with substance use leading to better treatment retention in the present study may have many explanations. Substance use in another individual in the family would have exposed the index patient to the harms that can occur due to long-term effects of substance use. Alternately, having a family member with substance use might alert the other caregivers to the need and benefits of prompt treatment. Having a family member with substance use might also make the index patient more aware about treatment facilities, and give a companion for seeking treatment at the healthcare center.

**Strengths of the study**
The study explores a rather under-researched area. There is a relative paucity of published literature about factors predicting retention of treatment among substance users in India. The findings add important information to this area. The study included individual with the use of different psychoactive substances. This gives a more realistic reflection of the actual treatment seeking pattern at the de-addiction center. Retention rates were assessed beyond the period of inpatient stay.

**Limitations of the study**
The findings of the study should be interpreted considering its constraints. The limitations include a restricted sample size, sample comprising of primarily patients with opioid use disorders, and chart-review based methodology, which restrict the amount of information that could be gleaned. Possible follow-up of the patient at other centers could not be ascertained. The results are based on findings of one center and generalization to other treatment setting should be made with caution.

**CONCLUSIONS**
To conclude, this study looks at the some of the predictors of treatment retention. The study has looked at a constellation of demographic and clinical variables that might influence retention, among a galaxy of factors that can influence patient outcomes. Nonetheless, this earnest effort may help clinicians in identifying patients at risk for drop-out. Efforts need to be made to understand in a larger prospective sample factors that predispose to treatment drop-out and ways to minimize them.

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**Conflicts of interest**
There are no conflicts of interest.

**REFERENCES**

1. Darke S, Ross J, Teesson M, Ali R, Cooke R, Ritter A, et al. Factors associated with 12 months continuous heroin abstinence: Findings from the Australian Treatment Outcome Study (ATOS). J Subst Abuse Treat 2005;28:255-63.

2. Siqueland L, Crits-Christoph P, Gallop R, Barber JP, Griffin ML, Thase ME, et al. Retention in psychosocial treatment of cocaine dependence: Predictors and impact on outcome. Am J Addict 2002;11:24-40.

3. McKellar J, Kelly J, Harris A, Moos R. Pretreatment and during treatment risk factors for dropout among patients with substance use disorders. Addict Behav 2006;31:450-60.

4. Kelly JF, Moos R. Dropout from 12-step self-help groups: Prevalence, predictors, and counteracting treatment influences. J Subst Abuse Treat 2003;24:241-50.

5. Joe GW, Simpson DD, Broome KM. Retention and patient engagement models for different treatment modalities in DATOS. Drug Alcohol Depend 1999;57:113-25.

6. Mertens JR, Weisner CM. Predictors of substance abuse treatment retention among women and men in an HMO. Alcohol Clin Exp Res 2000;24:1265-33.

7. Mammo A, Weinbaum DF. Some factors that influence dropping out from outpatient alcoholism treatment facilities. J Stud Alcohol 1993;54:92-101.

8. Siqueland L, Crits-Christoph P, Frank A, Daley D, Weiss R, Chittams J, et al. Predictors of dropout from psychosocial treatment of cocaine dependence. Drug Alcohol Depend 1998;52:1-13.

9. Green CA, Polen MR, Dickinson DM, Lynch FL, Bennett MD. Gender differences in predictors of initiation, retention, and completion in an HMO-based substance abuse treatment program. J Subst Abuse Treat 2002;23:265-95.

10. Cahill MA, Adinoff B, Hosi H, Muller K, Pulliam C. Motivation for treatment preceding and following a substance abuse program. Addict Behav 2003;28:67-79.

11. Ryan RM, Plant RW, O’Malley S. Initial motivations for alcohol treatment: Relations with patient characteristics, treatment involvement, and dropout. Addict Behav 1995;20:279-97.

12. Mitchell AJ, Selmes T. Why don’t patients attend their appointments? Maintaining engagement with psychiatric services. Adv Psychiatr Treat 2007;13:423-34.

13. Balhara YP. A chart review based comparative study of retention rates for two dispensing regimens for buprenorphine for subjects with opioid dependence at a tertiary care substance use disorder treatment center. J Opioid Manag 2014;10:200-6.

14. Singh SM, Mattoo SK, Dutta A, Chakrabarti K, Nebhianini N, Kumar S, et al. Long-term outcome of in-patients with substance use disorders: A study from North India. Indian J Psychiatry 2008;50:269-73.

15. Lo Sasso AT, Lyons JS. The effects of copayments on substance abuse treatment expenditures and treatment reoccurrence. Psychiatr Serv 2002;53:1605-11.

16. Friedman AS, Terras A, Kreisher C. Family and client characteristics as predictors of outpatient treatment outcome for adolescent drug abusers. J Subst Abuse 1995;7:345-56.

17. Richter SS, Brown SA, Mott MA. The impact of social support and self-esteem on adolescent substance abuse treatment outcome. J Subst Abuse 1991;3:371-85.

18. Balhara YPS, Ranjan R, Dhawan A, Yadav D. Experiences from a community based substance use treatment centre in an urban resettlement colony in India. J Addiction 2014;2014:982028.