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Risk Factors for Early Discharge from a Residential Addiction Treatment Program

Robert Gundel[1*], Normand Allen III[1], Sarah Osborne[2] and Sahel Shwayhat[3]

[1]*Departments of Outcomes Measures, Mountainside Treatment Center, USA*

[2]*Program Development, Mountainside Treatment Center, USA*

[3]*Operations, Mountainside Treatment Center, USA*

[*]**Corresponding author:** Robert Gundel, Departments of Outcomes Measures, Mountainside Treatment Center, USA, Tel: 860-362-5233; Ext. 228; E-mail: bob.gundel@mountainside.com

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Abstract

Objective: To identify potential risk factors for subjects who leave residential treatment against staff advice (ASA).

Methods: We have completed a retrospective chart review of 4095 subjects admitted to a residential substance use disorder (SUD) treatment program to identify specific factors that may contribute to the risk of subjects leaving treatment ASA. All data including demographic information, co-occurring symptoms information obtained from standardized questionnaires, and discharge status were stored in an electronic medical record database.

Results: Of the 4095 subjects, 3448 (84%) completed the program, 340 (8.3%) left ASA, 154 (3.8%) were discharged for non-compliance with rules, and 153 (3.7%) were transferred to other facilities better suited for a subjects' needs. The average length of stay (LOS) for subjects that left ASA was 11.5 days compared to those subjects who completed treatment had an average LOS of 29.5 days.

The highest to lowest ASA risk by substance type was cannabis, cocaine, heroin, sedatives, opioids and alcohol. Females in heroin and sedative groups had a significantly lower completion rate compared to males (74.9% vs. 81.6% and 63.4% vs. 87.0%). There were no differences in completion rates between males and females in the other substance groups.

Questionnaires for symptoms of co-occurring disorder were completed by a subset of subjects admitted to the residential facility from January to December 2016 and used to compare the average LOS and scores for anxiety, depression, craving and insomnia. Scores above threshold levels for anxiety, depression and/or insomnia were identified as risk factors for subjects in the heroin group. Risk factors for leaving treatment early in the alcohol group included scores above threshold for cravings and/or insomnia.

Conclusion: Several characteristics were identified as risk factors for leaving treatment ASA. This information is important for use in further development of evidence based treatment strategies that maximize long-term recovery.

Keywords: Substance use disorder; Length of stay; Risk factors; Depression; Anxiety; Craving; insomnia

Introduction

Substance use disorder (SUD) is an important public health problem in the United States [1]. The death toll associated with drug and alcohol addiction is estimated to be 60,000 per year with deaths related to opioid/opiate use alone approaching 30,000 [2]. A recent SAMHSA publication reported that there are approximately 22.7M people in the United States who meet the criteria for SUD but only 10 percent (approximately 2.5M) receive treatment [3].

Addiction treatment facilities offer a continuum of levels of care such as detox, residential, extended care and outpatient services. Detox facilities provide a safe environment for medical monitoring and assistance for subjects to cease using and begin to recover their health generally over a 5 to 10 days period. Once stabilized in detox, many subjects enter a residential facility which continues to provide an intensive, highly structured treatment environment. Often these facilities offer both cognitive based and mindfulness therapy designed to help subjects manage their addiction and co-occurring disorders such as anxiety or depression. Residential programs usually range from 30 to 90 days with some programs being six months in duration [3].

The goal of addiction treatment is to educate clients and their families about addiction. At the same time, clients are taught skills that promote a healthy lifestyle and specific coping skills that can be used after treatment to prevent relapse. Studies have shown that residential programs are effective as part of an overall theme of the length of time in treatment being associated with a better long-term outcome [4-7]. Unfortunately, most who do receive treatment suffer a high relapse rate which suggests there is still much to learn about the most effective treatment of SUDs.

The risk of relapse is increased if a co-occurring condition such as anxiety or depression exists [8-10]. A SAMHSA report published in 2014 estimates that up to 43 million Americans suffer from some form of mental illness [1]. Of the 20.2M adults with SUD, almost 8 million (40%) are reported to have a mental health disorder. Of the 2.5M who do seek SUD treatment, 45% have a co-occurring mental health disorder [3]. These data are indicative of a significant prevalence of co-occurring disorders in the SUD population making it imperative that the co-occurring disorders are treated in an integrated fashion to improve the subject's chances for a sustained long-term recovery.

To improve the understanding of which specific characteristics, predispositions, treatment histories, and co-occurring disorders increase the risk of leaving treatment early against staff advice, we completed a retrospective analysis of more than 4000 charts from a 30 days residential substance use treatment facility. Here we report on our analysis designed to identify potential risk factors related to early discharge.

Methods

Sample population

All subjects were admitted to a 30 days residential program for SUD. Subject demographic information, substance use, treatment history and treatment related information were obtained upon admission to the facility and stored in the electronic medical record database. All protocols for data collection, storage and analysis were reviewed and approved by an independent review board (Regulatory and Technical Associates, Allendale Investigational Review Board, Old Lyme, CT).

Treatment

All services were provided by professionals that are licensed, certified and/or specialists in their field. Treatment was inclusive of traditional therapy including group and individual sessions. Treatment was also provided through alternative approaches such as acupuncture, adventure based counseling, meditation and yoga. The standard of care provided is daily psychoeducational group therapy sessions, individual therapy sessions three times per week, and additional services and treatment modalities as indicated-based on the subject's individualized treatment plan and identified needs. In addition, subjects were referred for psychiatric evaluation, stabilization and/or medication management. Non-addictive medications were initiated, or maintained, for those subjects presenting with symptomology indicative of co-occurring disorders. Medication management services were provided on-site by board-certified psychiatrists and/or advanced practice registered nurses.

Procedure

Demographics, treatment attrition rate and length of stay assessments

All 4095 subjects admitted to the 30-day residential program between 2011 and 2016 were included in this analysis. Substance type, age, gender and other demographic information was obtained during the admission process for each subject and recorded in the electronic medical records database.

Assessments of co-occurring symptoms

This evaluation included 644 subjects admitted into the residential program over a one year period (2016). Subjects were assessed using standardized instruments (described below) designed to measure symptoms of anxiety, substance cravings, depression, and insomnia. These questionnaires were administered by staff at admission to the residential facility. Subject responses were entered into the electronic medical record database for subsequent analysis.

Measures

Anxiety: The level of anxiety was measured using the Generalized Anxiety Disorder scale (GAD-7) that consists of 8 questions scored using a 4-point scale (0, 1, 2, 3). A score of greater than or equal to the threshold score of 10 was considered clinically relevant.

Craving: Substance craving was scored using the Mountainside Substance Craving scale which is a 5-question survey with a 10-point scoring system (0-10). This instrument is a modification of the Brief Substance Craving Scale (BSCS). A total score of greater than or equal to 4.5 was considered clinically relevant.

Depression: The PHQ-9, a 10-question survey with a 4-point scoring system (0, 1, 2, 3) was used to determine the level of depression. A total score of greater than, or equal to, 10 was considered clinically relevant.

Insomnia: The amount and quality of sleep was scored using the Mountainside Sleep Assessment Scale. This is a 5-question survey modelled after the Pittsburgh Sleep Quality Index (PSQI) with a 3-point scoring system (0, 1, 2) where a score greater than, or equal to, 4 was considered clinically significant.

Data collection and analysis

All data was collected and recorded into an electronic medical records database. Subject demographic information was obtained and standardized questionnaires were administered at admission to the 30 days program. Data was pulled from the electronic medical records, summarized, and analyzed using Microsoft Excel and MiniTab™ statistical analysis software. The data was normally distributed and tested for variances using the F-Test Two-Sample analysis. Subsequent analyses were conducted using a t-Test Two-Sample and paired t-test assuming either equal or unequal variances. Comparisons of proportions and ratios were conducted using Fischer's exact test. In each case, a p value of less than or equal to 0.05 was considered statistically significant.

Results

A total of 4095 adult subjects were included in this study. Of those, 2798 (68%) were male and 1297 (32%) were female ranging in age from 18 to 84 years (average age 32.7 years). A total of 1839 subjects (45%) were in treatment for alcohol addiction, 152 (4%) for addition to cannabis, 195 (5%) for addiction to cocaine, 1108 (27%) for addiction to heroin, 556 (14%) for addiction to non-heroin opioid/opiates, 153 (4%) for addiction to sedatives and 95 (2%) for other types of substances.

Figure 1 shows the percentages of each discharge category for the entire subject sample. Of the 4095 subjects, 3448 (84.2%) completed the 30 days program, 340 (8.3%) left ASA, 154 (3.8%) left for non-compliance and 153 (3.7%) left as therapeutic transfers.

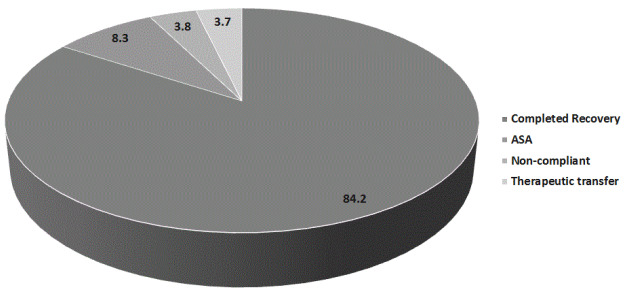

Figure 1: The percent of subjects based on their discharge status. In this study of more than 4000 subjects, 84% completed the program, 8% left ASA, 3.8% were discharged for non-compliance with the rules and 3.7% were transferred to another facility for medical reasons. Completed Recovery is a successful completion of the 30 days residential program. ASA is left against staff advice. Non-compliant is a discharge based on breaking the rules. Therapeutic Transfer is a discharge to another treatment facility.

The percentage of total subjects from each substance group leaving ASA and average LOS is shown in Figures 2A and 2B. Rank order ASA rates from high to low by substance shows that the cannabis group had the highest rate followed by cocaine, heroin, sedatives, opioids and alcohol. Average LOS ranging from shortest to longest is cannabis, heroin, opioids, alcohol, cocaine and sedative. The average LOS for four of the six substance groups was under two weeks.

There was no significant difference in age between male and female subjects in each substance group or when comparing subjects who left ASA to subjects who completed the residential program within each substance group (Table 1); however, significant differences were observed when comparing the average age between substance groups. Subjects in the cannabis and heroin groups were significantly younger compared to subjects in the alcohol group. There were no other significant differences between substance group ages.

Substance	Gender	% ASA	Number	Age	% Complete	Number	Age
Alcohol	Female	6.30%	47/745	44+/-13	88.30%	658/745	42+/-12
	Male	6.70%	75/1112	39+/-13	89.50%	995/1112	39+/-13
Cannabis	Female	13.60%	4/22	24+/-5	63.60%	14/22	22+/-3*
	Male	15.90%	21/132	24+/-7	65.90%	87/132	23+/-7*
Cocaine	Female	7.00%	4/57	22+/-2	79.00%	45/57	31+/-11
	Male	13.00%	18/139	31+/-10	77.00%	107/139	33+/-12
Heroin	Female	12.70%	38/299	24+/-6	74.9%**	224/299	24+/-6*
	Male	9.50%	77/814	26+/-7	81.60%	664/814	25+/-6*
Opioids	Female	7.70%	9/117	31+/-15	82.90%	97/117	30+/-11
	Male	7.70%	34/439	29+/-10	86.10%	378/439	27+/-8
Sedative	Female	19.5%**	8/41	31+/-14	63.4%**	26/41	32+/-14
	Male	4.40%	5/115	33+/-10	87.00%	100/115	27+/-9

Table 1: Sample demographics, substance type and discharge status; *Significantly different from alcohol subject group, $p<0.05$, **Significantly different from males in the substance group, $p<0.05$.

The analysis based on gender shows that female heroin subjects had a lower percentage program completion rate compared to male heroin subjects (74.9% vs. 81.6%, $p<0.05$). Female subjects in the sedative group had a lower percentage program completion rate and a higher percentage ASA compared to male subjects in this substance group (63.4% vs. 87.0%, $p<0.05$ and 19.5% vs. 4.4%, $p<0.05$, respectively). There were no significant differences between gender and ASA and/or completed program rates for alcohol, cannabis, cocaine or opioids subject groups.

The standardized assessment data only includes a subset of subjects admitted to the residential facility from January 1st to December 31st, 2016 (n=644 subjects). Assessment scores were used to compare the average LOS and assessment scores for anxiety, depression, substance craving and insomnia obtained at admission to the residential facility.

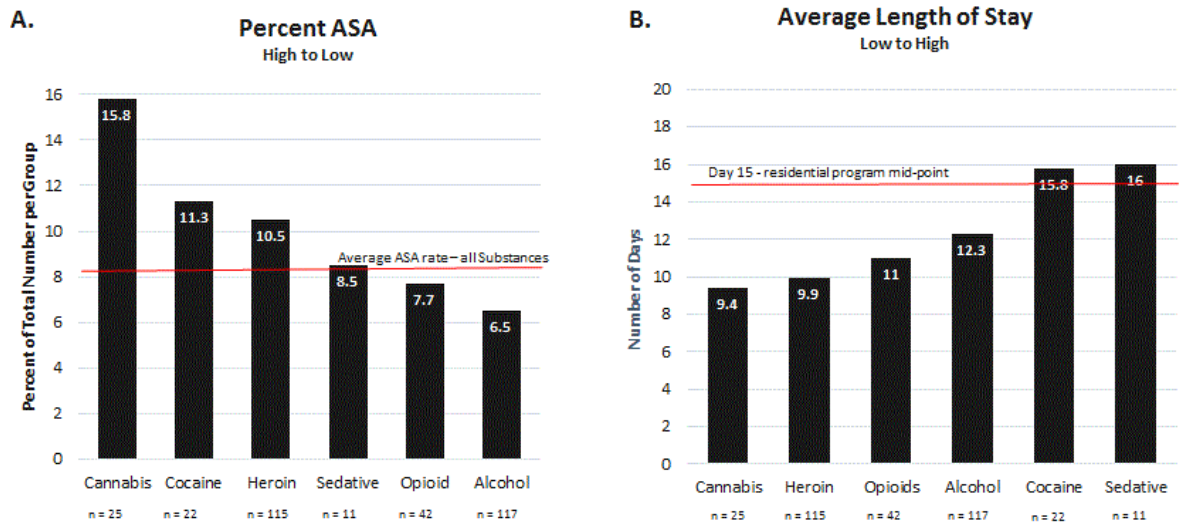

Figure 2: A. Rank order based on the percent ASA rate for each substance group. Cannabis had the highest ASA rate followed by cocaine, heroin, sedatives, opioids and alcohol. n = number of subjects in each group; B. Rank order of length of stay for each substance group. The cannabis group had the lowest length of stay followed by heroin, opioids, alcohol, cocaine and sedative/hypnotics.

An analysis was conducted based on substance type and assessment score for the alcohol and heroin groups (Figures 3A and 3B). Other substances were not included due to the small sample sizes. Those in the heroin subject group scoring above threshold for anxiety, depression and/or insomnia had a significantly shorter LOS compared to those who scored below threshold. There was no significant difference in LOS between those scoring above or below the threshold for cravings in the heroin subject group. In the alcohol subject group, there was a significant difference in LOS when comparing those scoring above or below threshold for craving and insomnia. No significant difference in LOS was seen for those scoring above or below threshold for anxiety or depression in this substance group.

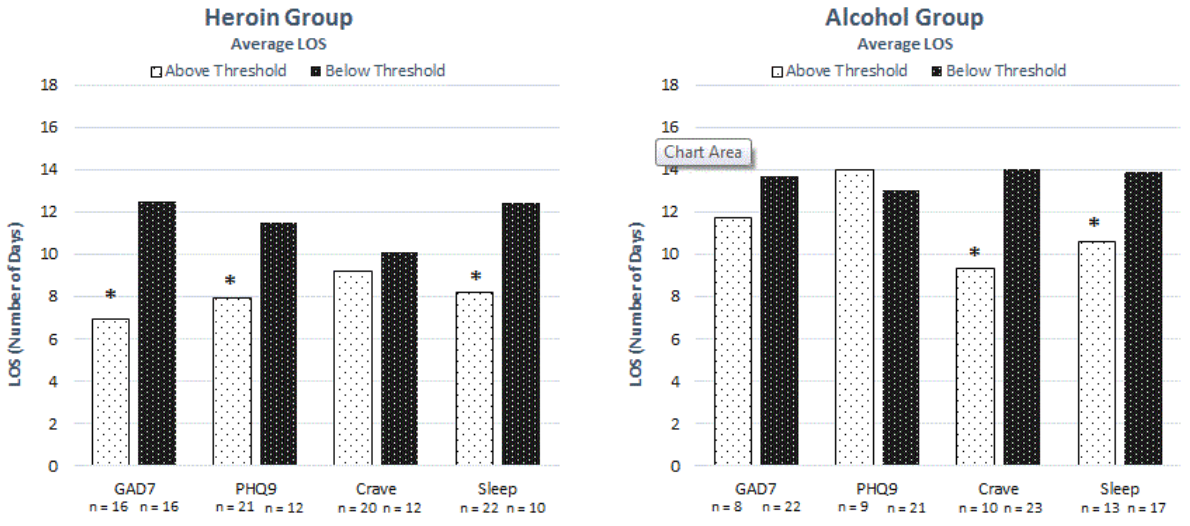

Figure 3: A. The average length of stay for heroin subjects who left treatment ASA based on scoring above or below threshold for anxiety, depression, craving and insomnia. Subjects scoring above threshold for anxiety, depression or insomnia had lower length of stays compared to subjects scoring below threshold. There was no difference in length of stay for subjects who scored above or below threshold for substance craving, * $p<0.05$; B. The average length of stay for alcohol subjects who left treatment ASA based on scoring above or below threshold for anxiety, depression, craving and insomnia. Subjects scoring above threshold for craving and insomnia had lower length of stays compared to subjects who scored below threshold. There were no differences in length of stay for subjects scoring above or below threshold for anxiety or depression, $^{*}p<0.05$.

Discussion

The objective of this study was to identify potential risk factors that may contribute to subjects with substance use disorders leaving residential treatment early against staff advice (ASA). A retrospective chart review of more than 4000 subjects was conducted utilizing a variety of standard methods for evaluation. Of these subjects, 84% successfully completed the program, about 8% left early against staff advice, the remaining 8% were transferred to other facilities (therapeutic transfer) or administratively discharged for non-compliance with facility rules. Variables such as primary drug of choice, symptoms of co-occurring disorders, age and gender were identified as contributing factors to a higher risk of leaving treatment early.

The average ASA rate for the entire group of subjects was 8.3%. The rank order of highest to lowest ASA rate based on substance type was cannabis (15.8%), followed by cocaine (11.3%), heroin (10.5%), sedatives (8.5%), opioids (7.7%) and alcohol (6.5%) being the lowest. In some cases, this rank order did not align with length of stay (LOS). For example, while cocaine ranked second highest in ASA rate (11.3%), this group had one of the longer LOS (15.8 days). Other substance groups showed alignment with ASA rate and LOS. The cannabis group had the highest ASA rate, 15.8% and lowest LOS, 9.4 days. Four of the six substance types examined had a LOS less than 2 weeks; thus, leaving before the halfway point of the residential program. The average LOS for all subjects together who left ASA was 11.5 days.

The results of our study suggest differences between substance types and LOS for subjects who left treatment early. The LOS of each substance group roughly corresponds with the reported duration of acute withdrawal symptoms for each substance type. Subjects using substances with short acute withdrawal episodes, in general, had a shorter LOS. Studies have shown that the acute withdrawal period for cannabis is approximately 5 days, 7 days for alcohol and 10 days for heroin/opioids while lasting for 1 to 2 weeks for cocaine and 1-5 weeks for sedative [11-15]. We found that subjects who left early from the cannabis, heroin and alcohol groups had an average LOS of approximately 10 days while subjects from the cocaine and sedatives groups had an average LOS of 16 days. It is tempting to speculate that relief from acute withdrawal symptoms contributes to a lack of motivation to remain in residential treatment. A further examination of this possible relationship was not included in this investigation but represents a potential area of additional study that could aid therapists to identify subjects at risk for leaving treatment early.

In a recent study, Sarkar et al. examined 942 SUD patients admitted to a 2 to 3 weeks residential treatment program [16]. Of these patients, 82.7% completed treatment and 10.1% left ASA. These percentages are similar to those reported in our study. In addition, they found that the substance group with the highest ASA rate was opioid (heroin and non-heroin opiates), followed by cannabis and alcohol. They also reported that older subjects were more likely to leave treatment early. The authors speculate that one reason for older patients leaving treatment early is due to the chronicity of their SUD and difficulties with withdrawal symptoms. In contrast, our results and other published work show that subjects most at risk for leaving treatment early are younger individuals [17-21]. In our study, the average age of subjects with the highest ASA rates (cannabis and heroin groups) was significantly less than that of the alcohol group which had the lowest ASA rate (22.5 +/- 6, 23.2 +/- 4 and 42 +/- 1, respectively; $p<0.05$). Comparable results were published by Gilchrist from a study examining factors associated with early discharge against medical advice in 1,228 alcohol and drug dependent subjects [22]. They found the highest percentage of early discharge subjects were younger and addicted to heroin or opioids (~27% ASA rate). As in our study, they also found the lowest early discharge rates for subjects in treatment for alcohol addiction (~10% ASA rate). Although the percentages they report are slightly higher than those found in our study, the general trend showing that younger individuals addicted to heroin/opioids having more difficulty completing treatment is consistent.

We found a significant difference in the percentage of subjects completing the program and leaving treatment early when comparing males and females based on primary substance type. Female subjects had a significantly lower treatment completion rate compared to male subjects in the heroin group (74.9% vs. 81.6%) and the sedative group (63.4% vs. 87.0%). The average percentage of females leaving treatment early in the heroin and sedative groups was also higher than males (19.5% vs. 4.4% and 12.7% vs. 9.5%, respectively), although the increased percentage in the heroin was not statistically significant. This might be due to a higher percentage of female subjects from this group being discharged as therapeutic transfers and/or for non-compliance issues compared to male subjects (12.4% vs. 8.9%, respectively). Other studies investigating the role of gender in early attrition from SUD treatment have produced somewhat contradictory results with some finding no difference between gender while others indicate that females are more at risk for leaving treatment early [20,23-25]. It was only when we conducted our analysis based on primary substance type that differences in gender became evident with female subjects in the heroin and sedative groups have lower program completion rates, higher ASA rates or both.

Our analysis of LOS based on symptoms of anxiety, depression, craving and insomnia also revealed significant differences between substance groups. We found that subjects in the heroin group with symptoms of anxiety, depression and/or insomnia were more likely to leave treatment early. In contrast, symptoms of craving and insomnia were associated with leaving treatment early in alcohol subjects. Although there was a trend towards an association between symptoms of anxiety and leaving treatment early in alcohol subjects, this was not statistically significant.

Studies have described differences in post-acute withdrawal symptoms (PAWS) between substance types [26]. PAWS for alcohol addiction are well documented and include anxiety, anger, depression, mood swings, craving and insomnia. Our results show that symptoms of craving and/or insomnia were associated with leaving treatment early. Subjects scoring above threshold for craving and/or insomnia had a significantly shorter LOS compared to subjects scoring below threshold. Craving seemed to be particularly meaningful as the LOS was nearly double for subjects scoring below threshold compared to those scoring above.

In contrast, there was no difference in LOS associated with craving scores in the heroin subjects; however, we did see a significant decrease in LOS in subjects who scored above threshold for anxiety, depression and/or insomnia compared to those who scored below. Each of these symptoms are well described PAWS for recovery from heroin addiction.

Previous studies have suggested that substance craving is a key factor in substance use disorders and relapse [27-29]. We have previously found that craving is present in a high percentage of both alcohol and heroin users at the time of admission to residential

treatment (RH Gundel et al., unpublished observations). Furthermore, the dissipation of craving symptoms while in treatment occurs at a slower, more protracted rate in heroin subjects compared to subjects in treatment for alcohol. Thus, it is surprising that we saw an association with craving and shorter LOS in the alcohol group but not in the heroin subjects. This finding may support the notion that relief of withdrawal symptoms is related to a decreased motivation to remain in treatment. Subjects who feel better lose interest in treatment and want to leave.

A limitation of this study on symptoms of co-occurring symptoms and LOS is the relatively small sample size for some of the substance groups. Although this analysis included 644 subjects admitted to the residential facility over the course of one year, only a small percentage of these subjects left treatment early ASA (~8% of all subjects). With most subjects in treatment for alcohol use disorder (45%) and heroin use disorder (27%), the other substance groups were too small for any reliable analysis. Larger studies are required to verify these initial findings for the differences observed between alcohol and heroin subjects in treatment as well as to identify potential co-occurring symptom factors associated with leaving treatment early for other substance types.

Conclusion

In conclusion, through a retrospective chart review of over 4000 subjects admitted to a 30 days residential addiction treatment facility, we have identified several potentially important risk factors associated with early discharge against staff advice. Risk factors include primary substance type, symptoms of anxiety, depression, substance craving, insomnia, age and gender, some of which appear to be substance type specific. An increased understanding of risk factors for leaving treatment early and how they differ based on the substance of choice can help treatment providers design and improve programs that allow subjects to remain in treatment, offering the best chance of long-term recovery.

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