Predicting Individuals Who are Most Likely to Leave a Substance Abuse Treatment Facility against Medical Advice

PROBLEM STATEMENT

With a rapidly growing opioid epidemic, the United States is currently undergoing a national crisis. It was estimated that in 2015, more than 52,000 Americans died as a result of an opioid overdose, with approximately two million suffering from a substance use disorder.[1] As such, effective drug and alcohol treatment programs and facilities are one of the essential components to addressing this epidemic. Nevertheless, while the majority of addicted individuals do not seek help, a 2014 survey estimated that 25% of the population admitted to a program actually leave treatment prior to completion, with 40-60% relapsing from their plan of treatment.[2] These grim statistics highlight a persistent and costly problem for individuals, society, substance abuse treatment facilities and healthcare programs. Leaving the facility against professional advice not only exposes the individual to the risk of an insufficiently treated medical problem, a likely relapse and subsequent readmission or death. The high rate of individuals leaving treatment against professional advice quickly becomes a financial burden to the treatment center and overall healthcare system.[3]

TARGET POPULATION

Identifying the reasons why patients choose to leave treatment against medical advice is critical to understanding the needs of those who are at highest risk for leaving a treatment program prior to completion, and affords opportunities to prevent excess healthcare costs, morbidity, and mortality. Therefore, the target population of this study are facility administrators, CEOs, medical staff and the management team at substance use treatment facilities.

Based on the results of the analysis, the client will be better informed of their treatment population, target high risk individuals for leaving treatment, and be able to effectively intervene at earlier stages. Overall, this study would allow stakeholders to focus additional resources and attention on individuals highest at risk for not completing treatment. As a result, a facility may be better able to retain high risk individuals in order to provide the appropriate level of care, and subsequently decrease both potential relapses, readmissions and associated financial healthcare costs.

DATA SOURCE

This study will utilize the Treatment Episode Data Set -- Discharges (TEDS-D) from 2014, a national data system of annual discharges from substance abuse treatment facilities that is maintained by the Center for Behavioral Health Statistics and Quality, Substance Abuse and

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[1] *Underlying Factors in Drug Overdose.* https://jamanetwork.com/journals/jama/article-abstract/2657548?redirect=true

[2] https://luxury.rehabs.com/drug-addiction/recovery-statistics/

[3] https://www.samhsa.gov/prevention

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Mental Health Services Administration (SAMHSA). For 2014, TEDS-D provides information for 1.6 million discharges from alcohol or drug treatment facilities. Demographic, substance use characteristics and treatment completion are some of the information reported to individual state administrative data systems and reported in the TEDS-D data.

This data is publicly available on the SAMSHA website.

METHOD AND PROPOSED SOLUTION

There will be various stages to the methodology. First, an exploratory data analysis will be conducted with variables such as gender, age and ethnicity, and identified substance abuse related variables, such as primary substance, frequency of use, number of prior treatment episodes, and number of days waiting for treatment. This analysis will provide insight to how they will fit in the proposed model and if there are discrepancies and errors that need to be corrected prior to fitting the data to the models. However, the predictive model will be first built using machine learning and then evaluated with a test set of data. Finally, the solution will be implemented.

Expected deliverables will include a copy of the code, paper and tool to provide a risk score.

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