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Diagnosing substance use disorders in an Iranian treatment sample: A comparison of decision trees and logistic regression models

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Objective: Substance abuse creates considerable social and health care burdens throughout the world. In recent decades, Iran has witnessed major changes in the pattern of substance use. In the past, opium was most commonly used; however, today's youth more commonly use other substances such as heroin, hashish, cannabis, and cocaine. The aim of this study was to create a prediction model to better identify risk factors for drug abuse.

Methods: A prospective cross-sectional study was conducted in drug rehabilitation centres in South Khorasan Province, Iran. Of the 700 subjects who met inclusion criteria, 70% (N =491) were randomly selected to provide a training set for constructing decision tree and multivariate logistic regression (MLR) models. The remaining 30% (N = 209) were employed in a holdout sample to test the performance of the decision tree and MLR models. Predictive performance of different models was analysed by the receiver operating characteristic (ROC) curve using the testing set. Predictor variables were selected from demographic characteristics and history of drug use.

Results: For the decision tree model, the sensitivity and specificity for identifying people at risk for drug abuse were 66% and 75%, respectively, while the MLR model was somewhat less effective at 60% and 73%. In decision tree model, the variables of the first substance used, age, smoking history, smoking onset age, education, and alcohol consumption were the most important factors in identifying individuals at risk. The first substance experience was the most important variable, which was chosen as the root node of the tree. Next, the variable of smoking history and, finally, the variables of alcohol use and education were added to the model as important factors.

Conclusions: While these study findings are exploratory and lack generalisability, they do suggest that the decision tree model holds promise as an effective classification approach for identifying risk factors for drug abuse. These results are consistent with prior research in Western contexts, which indicate that age of drug use initiation is a critical factor predicting a substance use disorder.