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Patient predictors of alcohol treatment outcome: A systematic review

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Abstract

Patient characteristics as predictors of alcohol use disorder treatment outcome were examined on three levels, identifying whether or not variables were significant predictors of drinking-related outcome in univariate analysis, in multivariate analysis, and in multivariate analyses limited to studies including several "key predictors." Also, a model was developed to predict total percentage of variance in treatment outcome accounted for in each study using each of the key predictors and a range of methodological factors. The most consistent univariate predictors were baseline alcohol consumption, dependence severity, employment, gender, psychopathology rating, treatment history, neuropsychological functioning, alcohol-related self-efficacy, motivation, socioeconomic status/income, treatment goal, and religion. When these key predictors were combined into multivariate analyses, baseline alcohol consumption and gender showed substantial reductions in predictive consistency whereas the remaining variables were not greatly affected. The most consistent predictors overall were dependence severity, psychopathology ratings, alcohol-related self-efficacy, motivation, and treatment goal. The two predictor variables most associated with greater variance accounted for in predictive models, when controlling for broader methodological variables, were baseline alcohol consumption and dependence severity. Few predictor variables were examined in more than a third of studies reviewed, and few variables were found to be significant predictors in a clear majority of studies. However, a subset of variables was identified, which collectively could be considered to represent a consistent set of predictors. Too few studies controlled for other important predictor variables. Attempts to synthesize findings were often hampered by lack of agreement of the best measure for predictor variables.

Keywords: Alcohol; Treatment outcome; Prediction; Prognosis; Motivation; Self-efficacy; Dependence severity; Psychopathology; Treatment goal

1. Introduction

Prediction of treatment outcome provides the opportunity to deliver three key benefits to the clinical setting: identifying specific client groups achieving poorer outcomes, identifying areas to target in treatment, and improving accuracy of prognosis.

Identification of factors predictive of outcome may allow for identification of populations predicted to have poorer outcome, such as for demographic predictors, or clinical variables with relative stability over time, such as is the case with a number of diagnoses, for example, social phobia or comorbid substance use disorders. Treatment may consequently be tailored to better meet the needs of such groups to reduce the disparity with respect to outcome.

In contrast to predictive variables that are generally stable, those that may be considered more malleable can be identified as targets for manipulation as part of the treatment process. For example, where unemployment is found to predict poorer outcome, it is possible that treatment would be enhanced by actively addressing employment.

Improved prognostication allows a clinician to better inform the client and his or her family as to what may lie ahead. It allows for improved treatment planning with respect to intervention type, duration, and intensity (Kadden & Skerker, 1999). It should enable the clinician to set more realistic treatment goals and guide the client in his or her own goal setting.

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The search for predictors of treatment outcome may be seen to encompass attempts to achieve two different functions. One is to identify causal risk factors, while the other is to find consistent correlates of outcome irrespective of causality. This latter function identifies risk factors that may not be causal as their correlation with outcome is merely a product of their correlation with a strong causal risk factor. Such risk factors are thus termed "proxy risk factors" (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). Two implications of these different functions are the timing of potential predictor variable measurement and the method of analysis.

For predictive purposes, potential predictors could be measured at different times relative to the delivery of treatment. If prediction is to be used to determine the allocation of treatment resources, then, clearly, this is best achieved by predicting prognosis early in this process. On the other hand, to understand the process of relapse, one could measure the independent variables at a much wider variety of times, with measurement closest to the point of relapse likely to be most informative (Connors, Maisto, & Zywiak, 1996).

The second implication relates to the role of covariates. To successfully identify the unique contribution of a variable to predicting treatment outcome, one must be able to partial out known covariates of relapse. Such covariates can either be proxy risk factors, which would no longer predict outcome if appropriate covariates were included in the analysis, or overlapping risk factors, which would be found to have diminished predictive strength when examined concurrently.

Better understanding of consistent predictors of treatment outcome is important, as clinical prediction of human behavior and traits has been shown to be inferior to that produced by mechanical or computational means (Breslin, Sobell, Sobell, Buchan, & Cunningham, 1997; Grove, Zald, Lebow, Snitz, & Nelson, 2000). Reasons suggested for the poorer performance of clinicians, even those with substantial experience and training, included ignoring base rates, assigning nonoptimal weights to cues, failure to take into account regression toward the mean, and failure to properly assess covariation. Grove et al. (2000) also point out that clinicians often do not receive sufficient feedback on the accuracy of their judgments with which they could modify judgment bias.

Gibbs and Flanagan (1977) examined 45 studies reporting on the prediction of alcoholism treatment outcome, collating 208 candidate predictor variables. They concluded that no stable predictor characteristics could be identified, although by taking a more liberal definition of a "somewhat stable" predictor, they were able to identify psychopathology, Wechsler arithmetic scores, steady work history, being married/cohabiting, employment, higher status occupation, fewer arrests, history of Alcoholics Anonymous (AA) contact, and higher social class as predictors of better outcome. The authors go on to highlight methodological weaknesses that they believed had hampered their task, including sampling error, high attrition, alcoholism poorly defined, heterogeneous treatments, inconsistent outcome criteria, varying time to follow-up, and small samples.

Two reviews of baseline patient predictors of outcome for broader substance use treatment are worthy of mention. McKay and Weis (2001) identified 12 studies with a minimum 2-year follow-up period, 7 of which were for alcohol treatment studies. The most consistent baseline predictors of outcome were pretreatment level of substance use and psychiatric severity, although, in both cases, these predicted worse outcome for approximately 65% of significant reports and better outcome for 20% of reports, with the remainder relating to treatment interaction effects. Motivation and coping were also found to be relatively consistent predictors of outcome but were much less frequently studied. Demographic variables were poor predictors. The authors did not comment on whether or not there were differences across studies that might be ascribed to the substance treatment modality (i.e., alcohol vs. other drug).

In a meta-analysis of 69 studies predicting continued drug use by opioid treatment clients, Brewer, Catalano, Haggerty, Gainey, and Fleming (1998) identified 10 significant predictors of future drug use. These were high levels of pretreatment opioid/other drug use, prior treatment for opioid addiction, no prior abstinence from opioids, abstinence from/light use of alcohol, depression, high stress, unemployment/employment problems, association with substance abusing peers, short length of treatment, and leaving treatment prior to completion.

While these reviews may be applicable to alcohol misuse populations, there is clearly the need to systematically examine the large number of studies specific to alcohol treatment that have identified patient predictors of treatment outcome over the past 30 years. In addition, such a review provides the opportunity to extend earlier work by taking a closer look at how multivariate analysis can aid in identifying more potent causal risk/protective factors (Kraemer et al., 2001).

2. Method

2.1. Study identification and selection

Online databases searched were PsychLit, Medline, and Embase. Keywords, mapped onto the subject heading Alcoholism, were *prognosis*, *prediction*, *prospective study* or *risk factor*, and *follow-up*, *treatment outcome* or *recurrence*. The search was restricted to human subjects, English language, adult (18–64 years) population, and publication date 1977–2005. Additional papers were identified via citations in other reviewed papers.

Studies identified in the above searches were included only if they met the following criteria:

1. Most participants must have been identified as alcohol dependent or alcoholic, either using formal diagnostic