Validation of a DIS-III-R Rescoring Algorithm for DSM-IV Alcohol-Use Disorders*

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ABSTRACT. Objective: The aim of this study was to evaluate the validity of the Diagnostic Interview Schedule, Version III, Revised (DIS-III-R), rescoring algorithm when compared with Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), diagnoses established using the Composite International Diagnostic Interview (CIDI). The research question is "Does our DIS-III-R rescore accurately reflect DSM-IV diagnoses established independently using the CIDI?" **Method:** One hundred subjects were administered the CIDI and the DIS-III-R alcohol-use modules. The DIS-III-R criteria were rescored to the DSM-IV diagnosis using our published algorithm. The specificity of the

rescore, along with the sensitivity for abuse and dependence diagnoses, was computed. **Results:** The rescoring algorithm showed good sensitivity for lifetime alcohol abuse (60.4%) and dependence (80.0%) but poor specificity (0.0%). Current alcohol dependence was diagnosed with high sensitivity (100.0%) and moderate specificity (40.2%). Current alcohol abuse was diagnosed with poor sensitivity (18.2%). **Conclusions:** Our algorithm can be used to rescore DIS-III-R data to DSM-IV alcohol-use diagnoses, but one must use caution with respect to the timeframe of alcohol-use disorders and the specific diagnosis. (*J. Stud. Alcohol Drugs* 70: 143-146, 2009)

THE CRITERIA FOR DIAGNOSING alcohol-abuse and alcohol-dependence disorders used in the Diagnostic and Statistical Manual of Mental Disorders (DSM) have changed over the years as collective knowledge among members of the psychiatric community has progressed. The DSM, Third Edition, Revised (DSM-III-R; American Psychiatric Association, 1987) and DSM, Fourth Edition (DSM-IV; American Psychiatric Association, 1994) diagnostic criteria differ in that the DSM-IV (1) eliminates the overlap of symptoms between abuse and dependence evident in DSM-III-R, (2) has more abuse (four vs two) and fewer dependence (seven vs nine) criteria, (3) requires that symptoms must cluster in any 12-month period, and (4) introduces a subclassification system of dependence with and without physiological dependence. These changes in clinical practice pose a problem to researchers who require comparable diagnostic criteria to measure changes in these conditions over time.

These differences have led to difficulties interpreting sequences of cross-sectional surveys. The National Comorbidity Survey, conducted between 1990 and 1992 (Kessler et al., 1994), and the National Comorbidity Survey-Replication, conducted between 2001 and 2003 (Kessler et al., 2005), identify the prevalence of lifetime alcohol dependence as 14.1% and 5.4%, respectively. These estimates are not directly comparable to one another because they combine both

DSM-III-R and DSM-IV methodologies. Thus, the apparent difference in the prevalence identified at these two points in time may be unrelated to true changes in the population prevalence of alcohol dependence, an important caveat identified by the authors of these studies (Kessler et al., 2005).

Unsatisfactory resolution to the problem of incomparable data include (1) continued use of the DSM-III-R criteria, which does not reflect current knowledge of alcohol-use disorders, or (2) retiring data collected using DSM-III-R criteria altogether. This is especially problematic in expensive, large-scale surveys that use standardized screening instruments—such as the Diagnostic Interview Schedule, Version III, Revised (DIS-III-R; Robins et al., 1981), or the Composite International Diagnostic Interview (CIDI; Robins et al., 1988)—that are based on structured interviews. The DIS-III-R was developed to determine diagnoses corresponding to the DSM-III-R (American Psychiatric Association, 1987). Because it requires a minimum of clinical judgment, it can be administered by trained nonclinician interviewers. The DIS-III-R was commonly used in research when the DSM-III-R was current (Cottler et al., 1991; Jones et al., 1993; Murray et al., 1994). The CIDI was initially written at the request of the World Health Organization and the U.S. Substance Abuse and Mental Health Services Administration and is also appropriate for use by nonclinician interviewers. Standardized instruments for establishing DSM-IV (American Psychiatric Association, 1994) diagnoses include the CIDI Version 10 (Robins et al., 1982, 1988; Wittchen, 1994), the Semi-Structured Assessment for the Genetics of Alcoholism (Bucholz et al., 1994), and the Structured Clinical Interview for DSM (SCID; First et al., 2002). Because

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eliminating DSM-III-R-based data is not a satisfactory solution, it is desirable to examine translation algorithms that permit one to map DSM-IV criteria onto these data.

Our group currently is conducting a study to examine long-term changes in alcohol symptoms in a cohort of subject's first receiving driving while intoxicated (DWI) screening services in 1989. Among the objectives of this study is to estimate rates of recovery from alcohol abuse and dependence. Current practice uses DSM-IV criteria to identify these disorders, although the baseline diagnoses were established using the DIS-III-R program for DSM-III-R diagnoses. We require a method of translating DIS-III-R responses into DSM-IV diagnoses to truly understand rates of recovery and the factors that promote increased chances of recovery over time.

We have developed a computerized algorithm for rescoring the DIS-III-R alcohol module into DSM-IV diagnoses (C'de Baca et al., 2006) and have shown interversion agreement consistent with findings of other studies comparing the DSM-III-R with the DSM-IV. The goal of the current analysis was to evaluate the validity of the DIS-III-R rescoring algorithm for alcohol abuse/dependence when compared with DSM-IV diagnoses established using the CIDI. We hope to answer the following question: Does our DIS-III-R rescoring algorithm accurately diagnose DSM-IV alcohol-use disorders identified independently using the CIDI? If so, then researchers have a valid means of establishing DSM-IV diagnoses for study subjects who were originally diagnosed using DIS-III-R criteria.

Method

Study population

The study population consisted of individuals participating in a 15-year follow-up evaluation of a screening program for offenders convicted of a first DWI offense, the Lovelace Comprehensive Screening Program (LCSP). Details of the LCSP are presented elsewhere (Lapham et al., 1995). Briefly, the LCSP contracted with the Metropolitan Court of Bernalillo County, NM, to provide alcohol and drug screening services for convicted DWI offenders. The program was conducted between April 1989 and October 1995. The ongoing, 15-year follow-up study is designed to investigate long-term progression and recovery from mental health disorders, including alcohol abuse and dependence.

Between December 2005 and November 2006, 252 subjects were approached and 100 subjects (39.7%) were recruited from the 15-year follow-up study. Most subjects were women ($n = 61$; 61%), and the median age of the sample was 45 years. Most were Hispanic ($n = 53$; 53%), followed by 37 (37%) non-Hispanic whites and 10 (10%) American Indians. Eight (8%) subjects had a current drug-use disorder at the time of interview.

Assessments of alcohol abuse and dependence

Subjects completed the CIDI to establish DSM-IV diagnoses of psychiatric disorders, including alcohol abuse and dependence. The version being used is the 10th revision, and it provides the DSM-IV diagnoses based on an individual's responses. Three weeks after completing the CIDI, subjects were invited to complete the alcohol-use disorder module of the DIS-III-R. Mean days between the baseline interview and the DIS-III-R interview was 23.6 days, the minimum was 7 days, and the maximum length of time between interviews was 74 days.

Rescoring algorithm

A clinical psychologist (JCdB) reassigned questions from the DIS-III-R according to DSM-IV criteria. A subject was given a positive DSM-IV diagnosis for alcohol abuse if he or she endorsed the presence of any of the four DSM-IV alcohol-abuse symptoms. For alcohol dependence, we first determined the earliest onset and most recent expression among all symptomatic behaviors queried. We then cycled through all possible sets of three dependence symptoms and determined if all three in each set overlapped for at least 1 year during the subject's life. If one or more sets of three symptoms overlapped, the subject was given a positive DSM-IV dependence diagnosis. Initial analysis of our rescoring algorithm (C'de Baca et al., 2006) indicated agreement percentages between DSM-III-R and our rescore to DSM-IV are consistent with another published comparison between DSM-III-R and DSM-IV diagnoses (weighted $\kappa = .65$; 95% confidence interval: .61-.68) (Grant, 1996).

Data analysis

For this analysis, we asked the question, "Does our DIS-III-R rescore generate diagnoses similar to the CIDI DSM-IV diagnoses?" In other words, is our rescore accurate? The conventional measures of the accuracy of a diagnostic test are the sensitivity and specificity compared with DSM-IV diagnoses identified by the CIDI. Our analysis deviates from the conventional approach in that we have three disease levels—(1) no diagnosis, (2) abuse, and (3) dependence—for which the DIS-III-R rescore's accuracy must be assessed. Accordingly, we defined the following measures of accuracy: The *specificity* of the rescore is the probability that the rescore correctly identified a person with no DSM-IV alcohol-use disorder; the *sensitivity (abuse)* of the rescore is the proportion of subjects with a DSM-IV alcohol-abuse disorder who were correctly identified as such by the rescore. The *sensitivity (dependence)* of the rescore is the proportion of subjects with a DSM-IV alcohol-dependence disorder who were correctly diagnosed by the rescore. Thus, there are two measures of sensitivity corresponding to the alcohol-abuse

TABLE 1. Accuracy of the Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R), rescore for lifetime and 12-month alcohol-use diagnoses

DIS-III-R rescore	CIDI diagnosis					
	None		Alcohol abuse		Alcohol dependence	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Lifetime diagnosis						
None	0	0.0^{a,*}	8	16.7	0	0.0
Alcohol abuse	2	100.0	29	60.4^b	10	20.0
Alcohol dependence	0	0.0	11	22.9	40	80.0^c
CIDI lifetime diagnosis total	2	2.0**	48	48.0	50	50.0
12-month diagnosis						
None	33	40.2^a	0	0.0	0	0.0
Alcohol abuse	15	18.3	2	18.2^b	0	0.0
Alcohol dependence	34	41.5	9	81.8	7	100.0^c
CIDI 12-month diagnosis total	82	82.0	11	11.0	7	7.0

Notes: DIS-III-R = Diagnostic Interview Schedule, Version III, Revised; CIDI = Composite Diagnostic Interview Schedule. ^aSpecificity of the DIS-III-R rescore; ^bsensitivity (abuse) of the DIS-III-R rescore; ^csensitivity (dependence) of the DIS-III-R rescore. *=% of subjects within CIDI diagnosis; **=% of total subjects (*n* = 100) assessed using the CIDI. Statistics indicating agreement are in **bold**.

and alcohol-dependence disease states. Each measure of the rescore's accuracy is computed separately for 12-month and lifetime DSM-IV alcohol-use disorders. All data management, analysis, and presentation were conducted with the SAS software, Version 9.1.3 (SAS Institute Inc., Cary, NC).

Results

Two (2%) subjects were classified with no lifetime alcohol-use disorder according to the CIDI, whereas 48 (48%) and 50 (50%) subjects were classified with lifetime abuse and dependence disorders, respectively. Eighty-two subjects (82%) were classified by the CIDI with no 12-month alcohol-use disorder. Eleven (11%) and seven (7%) subjects had 12-month diagnoses of alcohol abuse and dependence, respectively.

Lifetime alcohol-use disorders were identified by the CIDI and by the rescore (Table 1). The bolded data indicate subjects who were correctly classified by our DIS-III-R rescoring algorithm. The percentages in these columns are estimates of the specificity, sensitivity (abuse), and sensitivity (dependence) measures of the DIS-III-R rescoring algorithm's accuracy. For lifetime alcohol-use disorders, these are 0%, 60.4%, and 80%. Table 1 shows similar results for 12-month diagnoses. For 12-month disorders, the specificity of the rescore was 40.2%, sensitivity (abuse) was 18.2%, and sensitivity (dependence) was 100%.

Discussion

The DIS-III-R rescore program effectively identified subjects with DSM-IV alcohol dependence for both 12-month and lifetime diagnoses. There was more moderate

sensitivity for lifetime alcohol-abuse diagnoses. Subjects with 12-month alcohol abuse were poorly identified by the DIS-III-R rescore, but, in our study, there were too few subjects to draw any definitive conclusions. The conversion of alcohol-abuse diagnoses between DSM-III-R and DSM-IV criteria is particularly problematic because the DSM-III-R specifies two criteria that are shared for both an abuse and a dependence diagnosis, whereas the DSM-IV moved both of these nonambiguously into the abuse category (C'de Baca et al., 2006).

The specificity of the rescore was low for the 12-month period and could not be accurately estimated for the lifetime diagnosis owing to small numbers of subjects with no diagnosis. Low specificity is potentially a significant problem, especially for genetic studies, where false-positives are particularly detrimental (Baron et al., 1990). The rescore, however, yields suitable lifetime dependence DSM-IV diagnoses. Thus, the rescore may be useful if false positives and low sensitivities for alcohol abuse are not considered harmful in evaluating study outcomes. The specificity of this algorithm needs to be better estimated in a larger sample with lower prevalence of alcohol-use disorders.

Establishing 12-month diagnoses using our rescore requires careful deliberation. One approach to this problem would be to combine the "no diagnosis" and the abuse categories and use the rescore to estimate the prevalence of 12-month alcohol dependence only. By combining these categories, the overall specificity is increased to 38%, and retains 99% sensitivity for the 12-month alcohol-dependence diagnosis. Such a strategy would require careful justification on the part of the researcher to be acceptable to the scientific community.

In conclusion, our experience is that there is an abundance of data on DSM-III-R alcohol-use disorders archived

by alcohol researchers, much of which was collected using the DIS-III-R. To retain the utility of these data for longitudinal studies requires a method to make the DSM-III-R alcohol-use diagnoses comparable to the DSM-IV currently in use. We have developed an SAS program that will rescore the DIS-III-R alcohol-use module into DSM-IV diagnoses. This analysis suggests that lifetime alcohol dependence is well identified by the algorithm. Twelve-month disorders are more problematically assessed, although the identification of 12-month alcohol dependence is identified moderately well by the rescoring program. Thus, the rescore—although accurate for some possible uses—has some limitations, specifically problems with sensitivity for lifetime use and specificity. These may be inevitable owing to inherent limitations in extrapolating from one system to the other. The rescoring program is available on our Web site (www.bhrcs.org/resource/computercode.aspx). We invite investigators to evaluate this scoring program further.

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