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PERFORMANCE OF THE RAPS4/RAPS4-QF FOR DSM-5 COMPARED TO DSM-IV ALCOHOL USE DISORDERS IN THE GENERAL POPULATION: DATA FROM THE 2000–2010 NATIONAL ALCOHOL SURVEYS

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Abstract

Background—A number of relatively short screening instruments have been developed for identifying alcohol use disorders (AUD), but performance has been evaluated against the standard Diagnostic and Statistical Manual of Mental and Behavior Disorders (DSM) criteria, and it is not known how screening instruments may perform based on the newly formulated DSM-5 criteria, which is a radical departure from previous versions of the DSM. Analyzed here is the performance of the RAPS4/RAPS4-QF against DSM-5 criteria for AUD compared to DSM-IV dependence and abuse criteria.

Methods—Sensitivity and specificity are analyzed in a merged sample of 21,386 respondents from three National Alcohol Surveys of the U.S. general population (2000, 2005, 2010)

Results—Sensitivity of the RAPS4 was lower for DSM-5 AUD (62.5%) than for DSM-IV dependence (88%), while the RAPS4-QF was higher for DSM-5 AUD (90.3%) than for DSM-IV abuse (81.3%), or abuse/dependence (85.8%), while maintaining good specificity (84%). Sensitivity of the RAPS4-QF was higher for males (92%) compared to females (86.6%) and highest for whites (93.8%) followed by Hispanics (84.2%) and blacks (82.4%).

Conclusions—Screening instruments may not perform similarly for DSM-5 as for DSM-IV AUD, and data here suggest the RAPS4-QF may be a good instrument choice for identifying those meeting criteria for DSM-5 AUD. These data also suggest the need for additional research and a similar evaluation of other commonly used screening instruments for DSM-5 AUD.

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Contributors

Dr. Cherpitel designed the study and wrote the protocol, managed the literature searches and summaries of previous related work and wrote the first draft of the manuscript. Mr. Ye undertook the statistical analysis and collaborated on writing. Both authors contributed to and have approved the final manuscript.

Conflict of Interest

No conflict declared

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Keywords

DSM-5; alcohol use disorders; RAPS4/RAPS4-QF

1. INTRODUCTION

A number of relatively short screening instruments have been developed for identifying alcohol use disorders (AUD) in clinical and general populations. Performance of these instruments have generally been evaluated for sensitivity and specificity against the Diagnostic and Statistical Manual of Mental and Behavior Disorders (DSM; American Psychiatric Association, 2000) criteria for alcohol dependence or alcohol abuse as the gold standard. One such instrument, the Rapid Alcohol Problems Screen (RAPS) identified the optimal five-item subset (which maximized sensitivity while maintaining reasonable specificity) from a number of instruments including the CAGE (Ewing, 1984), TWEAK (Russell et al., 1994), Brief MAST (Pokorny et al., 1972) and AUDIT (Saunders et al., 1993), and, based on both the DSM-IV (4th revision) and the International Classification of Disease (ICD-10; World Health Organization, 1990), was found to outperform other instruments for both males and females and across ethnic groups (Cherpitel, 1995). A further refinement of the RAPS, called the RAPS4, dropped one of the original five items (Cherpitel, 2000). As true for other instruments, the RAPS/RAPS4 was not as sensitive for alcohol abuse/harmful drinking as for dependence, and the addition of two quantity and frequency items (RAPS4-QF) was found to increase performance, and outperform other instruments, for alcohol abuse in a number of settings and countries (Cherpitel, 2002; Cherpitel and Bazargan, 2003; Cherpitel et al., 2005; Cremona and Cherpitel, 2008; Geneste et al., 2012). An evaluation of the RAPS4/RAPS4-QF in the U.S. general population found sensitivity/specificity of the RAPS4 was 86%/95%, respectively, for alcohol dependence and 54%/96% for abuse, while sensitivity/specificity of the RAPS4-QF was each 82% for alcohol abuse (Cherpitel, 2002). Sensitivity of the RAPS4 for dependence was similar for males and females, but better for whites than blacks or Hispanics, while sensitivity of the RAPS4-QF for abuse was higher for males than females, and higher for whites and Hispanics than blacks.

Screening instruments, including the RAPS4/RAPS4-QF, have been evaluated against the DSM-IV criteria for dependence and abuse, but little is known about the performance of these instruments against the newly formulated Diagnostic and Statistical Manual, 5th revision (DSM-5) alcohol use disorders (AUD) criteria, which has collapsed the alcohol abuse and dependence criteria into a single, unidimensional construct, dropping the criterion on legal problems and adding a criterion on craving (similar to that in the ICD-10; Hasin et al., 2013).

Reported here is the sensitivity and specificity of the RAPS4/RAPS4-QF against DSM-5 criteria for alcohol use disorder compared to DSM-IV dependence and abuse in a merged sample from three U.S. National Alcohol Surveys of the general population. Performance of the RAPS4/RAPS4-QF is examined by gender and across race/ethnicity.

This research is important for a better understanding of the efficacy of the RAPS4 and RAPS4-QF, which have been found to perform well against DSM-IV dependence and abuse criteria, respectively, in identifying DSM-5 AUD, and will shed light on the potential need for a similar evaluation of other commonly used screening instruments.

2. METHODS

2.1 Samples

Data analyzed are from the Alcohol Research Group's 2000, 2005 and 2010 National Alcohol Surveys (NASs). Fieldwork for the 2000 survey was sub-contracted to the Institute for Survey Research at Temple University, while fieldwork for the 2005 was sub-contracted to DataStat, Inc., and for the 2010 survey to Micro International. Data were collected using Random Digit Dial (RDD) Computer Assisted Telephone Interviews (CATI) of the U.S. general population 18 and over in all 50 U.S. states and the District, with an over-sampling of blacks and Hispanics, and an over-sample of low-population states. Respondents who self-identified as either "white of Hispanic origin" or "black of Hispanic origin" (Latino, Mexican, Central or South American, or any other Hispanic origin) were classified as Hispanic. Respondents who self-identified as "black, not of Hispanic origin" were categorized as black. Completed interviews were obtained on 7612 respondents, representing a 58% cooperation rate in the 2000 survey; 6919 respondents, representing a 56% cooperation rate in the 2005 survey, and 6855 respondents, representing a 50% cooperation rate in the 2010 survey (all of which have been considered acceptable rates for telephone surveys (Frey, 1989)). Non-response in all surveys was due to refusals, incapacitation, language barriers and failure to establish contact.

2.2 Data Collection

Interviews were conducted with informed consent once telephone contact had been established with the respondent by trained interviewers using a structured interview schedule of about 45 minutes in length. Hispanic respondents were given a choice of being interviewed in English or in Spanish, with bilingual interviewers. The Spanish version of the questionnaire underwent a process of translation and independent back-translation.

2.3 Instruments

2.3.1 RAPS4/RAPS4-QF—The RAPS4 consist of the following four items: (1) During the last year have you had a feeling of guilt or remorse after drinking? (Remorse). (2) During the last year has a friend or family member ever told you about things you said or did while you were drinking that you could not remember? (Amnesia, also called blackouts). (3) During the last year have you failed to do what was normally expected from you because of drinking? (Perform). (4) Do you sometimes take a drink in the morning when you first get up? (Starter, also called eye-opener). A positive response on any one of the four questions is considered positive on the RAPS4.

The RAPS4-QF added two quantity-frequency (QF) items: During the last year have you had 5 or more drinks on at least one occasion? (Quantity); and, During the last year did you

drink as often as once a month (Frequency). A positive response on any one of the RAPS4 items and/or both of the QF items is considered positive on the RAPS4-QF.

2.3.2 Alcohol Dependence/Alcohol Abuse—Alcohol dependence during the last year, based on the DSM-IV, was measured by 17 items covering seven domains as used in past NASs (Caetano and Tam, 1995; Caetano et al., 1997), including tolerance, withdrawal, drinking more than intended, unsuccessful efforts to control use, giving up pleasures or interests to drink, spending a great deal of time in drinking activities, and continued use despite problems (American Psychiatric Association, 2000). A respondent was considered alcohol dependent if positive on three or more domains.

Alcohol abuse was defined using 12-month alcohol-related consequences involving workplace problems (3 items), trouble with the law (3 items), aggression and interpersonal problems (4 items), and drunk driving and accidents (3 items), as used in prior NASs (Midanik and Greenfield, 2000). Item content reflects the DSM-IV definition of alcohol abuse (significant drinking-related failure to fulfill major obligations at work, school or home; interpersonal problems; legal problems; and drinking in hazardous situations). As in the DSM-IV, alcohol abuse is defined as positive for any of the four abuse domains and not dependent.

Alcohol use disorder (dependence and abuse), based on DSM-5 criteria, collapsed the above domains from the NAS, taking out the three DSM-IV abuse items having to do with “trouble with the law”, and added a criterion on “craving”, “Sometimes I have needed a drink so badly that I couldn’t think of anything else,” which is also included in the NAS surveys, resulting in 11 diagnostic criteria. A score of two or more was considered positive for AUD (Hasin et al., 2013).

2.4 Data Analysis

Data were weighted to adjust for the probability of selection (number of households, multiple phone lines and adult residents in households), ethnic oversampling and non-response. Data were also weighted to reflect the U.S. adult (aged 18+ years) population proportions of ethnicity by region by age by gender groups.

The sensitivity (percentage correctly classified as having the condition) and specificity (percentage correctly classified as not having the condition) are reported for the RAPS4 and RAPS4-QF against DSM-V AUD criteria compared to DSM-IV dependence and abuse criteria, all by gender and race/ethnicity.

3. RESULTS

The upper portion of Table 1 shows sensitivity and specificity of the RAPS4 for DSM-IV dependence and abuse. While the RAPS4 had good sensitivity for DSM-IV dependence (88%), as expected since it was optimized against DSM/ICD dependence criteria, sensitivity was poor for both DSM-IV abuse/dependence (49.7%) and DSM-5 AUD (62.5%), both of which also contained abuse criteria. Performance did not vary across gender or race/ethnicity.

The lower portion of Table 1 shows the sensitivity and specificity of the RAP4-QF, which was developed specifically to identify abuse/harmful drinking based on DSM and ICD criteria. The RAPS4-QF showed somewhat greater sensitivity for DSM-5 AUD (90.3%) than for either DSM-IV abuse (82.9%) or DSM-IV AUD (85.8%), while maintaining good specificity (84%). Sensitivity of the RAPS4-QF for DSM-5 AUD was higher for males (92%) compared to females (86.6%) and highest for whites (93.8%) followed by Hispanics (84.2%) and blacks (82.4%).

4. DISCUSSION

Analysis here of the performance of the RAPS4/RAPS4-QF against DSM-5 criteria for alcohol use disorder compared to DSM-IV dependence and abuse criteria, in merged data from three National Alcohol Surveys of the U.S. general population spanning a 10-year period (2000–2010), found sensitivity of the RAPS4 was lower for DSM-5 AUD (62.5%) than for DSM-IV dependence (88%), while the RAPS4-QF was higher for DSM-5 AUD (90.3%) than for either DSM-IV abuse (81.3%) or AUD (85.8%), and performed well across gender and race/ethnicity, while maintaining good specificity (84%).

The RAPS4-QF may have demonstrated good performance for DSM-5 AUD since both dependence and abuse criteria have been folded into the DSM-5 with the addition of a craving criterion (a strong desire or sense of compulsion to take the substance) as found in the ICD-10, and the RAPS4-QF optimized items based on both DSM-IV and ICD-10 dependence criteria. Additionally, the RAPS4-QF includes the quantity-frequency questions which were felt to potentially increase sensitivity for alcohol abuse, similar to the three QF items from the AUDIT (AUDIT-C) which have been found to be a good measure of heavy drinking behavior suggestive of alcohol abuse (Bush et al., 1998; Gordon et al., 2001; Reinert and Allen, 2002).

It should be noted that these findings reflect performance of the RAPS4/RAPS4-QF in the general population and findings may be different in clinical populations where AUD severity may be greater. For example, those with a more severe disorder would be more likely to endorse RAPS items than those with a less severe disorder, improving sensitivity of the screener.

The development of the DSM-5 is a radical departure from previous versions of the DSM, with an eye to improving the validity and utility of diagnosis (Helzer et al., 2007a, 2007b; Saha et al., 2006). Not surprising, however, screening instruments may not perform similarly for DSM-5 as for DSM-IV AUD, as found here. While the DSM-5 criteria are less complicated than the DSM-IV's and easier to use with only a single criteria list which diminishes the possibility of someone "falling through the cracks between abuse and dependence" (Schuckit, 2013), screening instruments that have typically been developed to identify alcohol dependence will only perform well at the more severe end for DSM-5 AUD. Data here suggest while the RAPS4-QF may be a good instrument choice for identifying those meeting criteria for DSM-5 AUD, additional research and a similar evaluation of other commonly used screening instruments for DSM-5 AUD is needed.

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Highlights

- It is not known how screening instruments may perform based on the newly formulated DSM-5 Alcohol Use Disorders (AUD) criteria compared to DSM-IV abuse and dependence criteria
- Screening instruments may not perform equally well for both sets of criteria
- The RAPS4-QF was found to perform well and may be a good instrument choice for identifying those meeting criteria for DSM-5 AUD
- Other screening instruments may benefit from such a comparison

Table 1
Sensitivity and specificity (95% confidence intervals) of RAPS4 against DSM-5 compared to DSM-IV AUD

	2+ DSM-5		DSM-IV dependence		DSM-IV abuse/dependence	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
Total	62.5 (59.0, 66.0)	97.0 (96.6, 97.3)	88.0 (84.5, 91.6)	94.3 (93.9, 94.8)	49.7 (46.5, 52.9)	96.9 (96.6, 97.3)
Women	60.0 (54.0, 66.1)	97.4 (97.0, 97.8)	86.4 (79.7, 93.0)	95.7 (95.1, 96.2)	49.5 (44.1, 55.0)	97.4 (97.0, 97.8)
Men	63.6 (59.3, 67.9)	96.5 (95.9, 97.0)	88.6 (84.4, 92.8)	92.8 (92.0, 93.6)	49.8 (45.9, 53.8)	96.4 (95.9, 97.0)
White	62.8 (58.5, 67.2)	96.9 (96.5, 97.4)	90.0 (85.3, 94.8)	94.2 (93.6, 94.8)	46.9 (43.1, 50.8)	96.9 (96.5, 97.4)
Black	63.3 (53.9, 72.7)	97.4 (96.6, 98.1)	85.6 (75.6, 95.5)	95.0 (94.0, 96.1)	57.7 (48.3, 67.2)	97.1 (96.3, 97.9)
Hispanics	61.7 (54.3, 69.2)	97.1 (96.3, 97.8)	80.7 (72.8, 88.6)	94.4 (93.4, 95.5)	57.5 (50.4, 64.7)	96.7 (95.9, 97.5)

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Table 2
Sensitivity and specificity (95% confidence intervals) of RAPS4-QF against DSM-5 compared to DSM-IV AUD

	2+ DSM-5		DSM-IV abuse		DSM-IV abuse/dependence	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
Total	90.3 (88.1, 92.4)	84.1 (83.4, 84.8)	81.3 (78.5, 84.2)	82.9 (82.2, 83.7)	85.8 (83.6, 88.1)	85.4 (84.7, 86.1)
Women	86.6 (82.9, 90.4)	90.8 (90.0, 91.6)	76.3 (71.5, 81.2)	90.0 (89.2, 90.8)	81.1 (77.3, 84.9)	91.3 (90.6, 92.1)
Men	92.0 (89.3, 94.6)	76.3 (75.1, 77.6)	83.6 (80.0, 87.3)	74.8 (73.5, 76.1)	87.9 (85.2, 90.6)	78.3 (77.1, 79.6)
White	93.8 (91.8, 95.7)	82.3 (81.4, 83.2)	83.9 (80.8, 86.9)	81.8 (80.9, 82.7)	87.2 (84.7, 89.6)	83.9 (83.0, 84.8)
Black	82.4 (74.1, 90.7)	92.4 (91.2, 93.6)	65.7 (53.6, 77.9)	89.1 (87.6, 90.7)	78.4 (69.7, 87.1)	92.4 (91.2, 93.6)
Hispanics	84.2 (77.8, 90.5)	86.4 (84.8, 88.0)	76.1 (68.0, 84.3)	82.7 (80.9, 84.6)	85.0 (79.8, 90.1)	86.6 (85.0, 88.2)