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Diagnostic accuracy of a two-item Drug Abuse Screening Test (DAST-2)

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HIGHLIGHTS

- The Drug Abuse Screening Test was revised to a 2-item measure (DAST-2) and validated.
- The DAST-2 is sensitive (95–97%) and specific (89–91%).
- The DAST-2 is appropriate for routine screening in VA primary care settings.

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ABSTRACT

Objective: Drug use is prevalent and costly to society, but individuals with drug use disorders (DUDs) are underdiagnosed and under-treated, particularly in primary care (PC) settings. Drug screening instruments have been developed to identify patients with DUDs and facilitate treatment. The Drug Abuse Screening Test (DAST) is one of the most well-known drug screening instruments. However, similar to many such instruments, it is too long for routine use in busy PC settings. This study developed and validated a briefer and more practical DAST for busy PC settings.

Method: We recruited 1300 PC patients in two Department of Veterans Affairs (VA) clinics. Participants responded to a structured diagnostic interview. We randomly selected half of the sample to develop and the other half to validate the new instrument. We employed signal detection techniques to select the best DAST items to identify DUDs (based on the MINI) and negative consequences of drug use (measured by the Inventory of Drug Use Consequences). Performance indicators were calculated.

Results: The two-item DAST (DAST-2) was 97% sensitive and 91% specific for DUDs in the development sample and 95% sensitive and 89% specific in the validation sample. It was highly sensitive and specific for DUD and negative consequences of drug use in subgroups of patients, including gender, age, race/ethnicity, marital status, educational level, and posttraumatic stress disorder status.

Conclusions: The DAST-2 is an appropriate drug screening instrument for routine use in PC settings in the VA and may be applicable in broader range of PC clinics.

1. Introduction

Drug use is prevalent in the U.S. and costly to society. Nearly one in ten U.S. adults used illicit drugs in the last 12 months (SAMHSA, 2014). Among 12th graders in the U.S., approximately half (48.9%) have tried and more than a third (38.6%) have used drugs in the past 12 months (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016). Drug use costs the U.S. over $193 billion per year in crime, poor health, and loss of productivity (US Department of Justice, 2011). Studies have found that 11.9% (Smith, Schmidt, Allensworth-Davies, & Saitz, 2010) and 16.7% (McNeely & Saitz, 2015) of non-VA PC patients, and 10.4% of VA PC patients (Tiet et al., 2015) have current drug use disorders.

Despite high rates of drug use, nearly 90% of individuals who need treatment for alcohol or illicit drug use disorders do not receive specialty treatment (SAMHSA, 2014). Drug screening instruments can help to identify individuals with drug use disorders and problems and to facilitate their treatment. The Drug Abuse Screening Test (DAST; Skinner, 1982) is one of the most commonly used self-report drug screens (Tiet, Finney, & Moos, 2008; Yudko, Lozhkina, & Fouts, 2007) and is designed to be administered by a clinician or self-administered (Skinner, 1982). The original 28-item DAST (DAST-28) and its shorter 20- and 10-item versions (DAST-20 and DAST-10) have been validated

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many times (Cocco & Carey, 1998; Maisto, Carey, Carey, Gordon, & Gleason, 2000; Smith et al., 2010; Wolford et al., 1999; Yudko et al., 2007).

A review (Yudko et al., 2007) of the DAST and its briefer versions showed the measure has been used in diverse populations and has moderate to high levels of validity (face, criterion, construct, discriminative) and reliability (test-retest, inter-item, and item-total). Different versions of the DAST have sensitivity ranging between 41% (Carey, Carey, & Chandra, 2003) and 96% (Gavin, Ross, & Skinner, 1989; Staley, & el-Guebaly, 1990), and specificity ranging from 68% (Cocco & Carey, 1998; Rosenberg et al., 1998) to 99% (Carey et al., 2003). A recent study not included in the review found the DAST-10 to be 100% sensitive and 77.1% specific for drug use disorders and 87.0% sensitive and 92.8% specific for identifying individuals with drug use problems (Smith et al., 2010).

However, based on previous reviews and recommendations, a practical screening instrument should not be longer than 4 items (Tiet et al., 2008; USPSTF, 2008); therefore, even the 10-item DAST is too long for busy clinical settings. For example, Bradley et al. noted that the 10-item Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was too long for routine use in screening for alcohol use disorder in health care systems and, therefore, that the CAGE (4 items; Ewing, 1984) was much more widely used than the AUDIT, even though the AUDIT had better psychometric properties as a screener for risky and harmful alcohol use (Bradley et al., 2004). Only when a 3-item AUDIT-C was developed did the AUDIT become a viable alternative for use in VA PCs (VHA, 2001). The current study attempted to develop a briefer version of the DAST that is practical for routine use in primary care settings. We revised the DAST-10 items following recommendations and guidance of previous reviews (McPherson & Hersch, 2000; Tiet et al., 2008; USPSTF, 2008). We applied these items to a large sample of PC patients and used half of the sample to select the best items to identify individuals with a drug use disorder or problem, and then used the other half of the sample to validate the brief DAST. We also examined the performance of this brief DAST in subgroups of patients based on demographic and psychiatric characteristics (i.e., race/ethnicity, gender, age, marital status, education, and posttraumatic stress disorder status).

2. Method

2.1. Sample

We recruited participants from two Department of Veterans Affairs (VA) primary care (PC) clinics in Northern California from February 2012 through April 2014 for the *Drug Screen for Primary Care Patients Study* (Tiet et al., 2015). A total of 3173 patients were approached in waiting areas; 1518 patients did not want to participate, and 355 patients cancelled or did not attend the appointment for consent and interview. A total of 1300 patients completed informed consent, but 17 were excluded due to cognitive issues (n = 5), repeat recruits (2), incomplete data (6), and spouses of clinic patients (4). Data from 1283 participants who provided written informed consent were included in the current analyses. The Stanford University School of Medicine Institutional Review Board reviewed and approved all study procedures.

2.2. Assessments

Trained research staff conducted computer-assisted structured interviews. We audio-recorded the interviews for quality control, and 1167 participants (91.0%) consented to the recording. We randomly selected 130 interviews (11.1%) to be reviewed by another research staff to ascertain the accuracy of the interviews. In addition to questions on substance use and a diagnostic interview for substance use and PTSD, the interviews included questions about demographic information, such as age, sex, racial and ethnic background, educational level, and marital and relationship status. In addition, 100 participants were randomly selected to be interviewed again one week later (between 4 and 10 days) to examine test-retest reliability.

2.3. Drug Abuse Screening Test (DAST)

We revised questions of the DAST-10 from a dichotomous "Yes/No" format to a continuous response format. For example, the first item of the DAST-10 asks: "Have you used drugs other than those required for medical reasons?" We revised this item to read, "How many days in the past 12 months have you used drugs other than those required for medical reasons?" The dichotomous response format limits the variance of the measure and reduces information about the frequency or intensity of drug use into just two levels (0 versus 1 +; Berman, Bergman, Palmstierna, & Schlyter, 2005). The continuous response format, along with tree-based ROC analyses (see explanation below), makes it possible to select a cut-point that may have better sensitivity and specificity. In addition, social desirability may reduce the truthfulness of responses to the DAST (Yudko et al., 2007). Using "Yes/No" questions to inquire whether the respondent used illicit substances (i.e., "Did you use drugs?") may create the impression that a negative answer is preferred (Tiet et al., 2008). In contrast, a question such as "How many days have you used drugs in the past 12 months?" is less likely to convey such an impression and more likely to elicit valid positive responses.

2.4. Criterion Measures

Two criterion measures were used: the Mini International Neuropsychiatric Interview (MINI) (Sheehan et al., 1997; Sheehan et al., 1998) for drug use disorders and the Inventory of Drug Use Consequences (InDUC; Tonigan & Miller, 2002) for negative consequences of drug use, which includes individuals who may or may not meet criteria for a drug use disorder.

2.5. MINI

The MINI is a structured diagnostic interview administered by lay interviewers, and has good concordance with the Composite International Diagnostic Interview (CIDI; Lecrubier et al., 1997; World Health Organization, 1990) and the Structured Clinical Interview for DSM-IV (SCID; Sheehan et al., 1997; Sheehan et al., 1998). In the current study, inter-rater reliability was established (kappa > 0.95) on 20 individuals before actual data collection began. Among the 1167 audio-taped interviews, 130 interviews (11.1%) were randomly selected and examined for inter-rater reliability. Kappa was maintained at 0.95 or higher at the item level, and a perfect inter-rater reliability was maintained at the diagnosis level.

The MINI assesses the use of eight major categories of both illicit drugs and prescribed medications, including stimulants, cocaine, narcotics, hallucinogens, inhalants, marijuana, tranquilizers, and miscellaneous. We showed participants a list of substances and read the following instructions: "I am going to show you and read to you a list of street drugs. The list also includes some medicines. Please only describe your use of a listed medicine if the medicine was not prescribed to you by a doctor or other qualified medical providers." Symptoms of drug use were assessed based on DSM-IV.

The Inventory of Drug Use Consequences (InDUC; Tonigan & Miller, 2002) was used to assess negative consequences of drug use. This second criterion identified individuals who had some drug use problems but may or may not have met the diagnostic criteria of a drug use disorder. This criterion captures individuals with sub-clinical drug use problems (along with those who meet criteria for a drug use disorder). A total of 37 items assessed four domains of drug use problems, including impulse control (e.g., get into trouble because of drug use), social responsibility (e.g., missed school or work), physical (e.g., being