

Assessment of Substances Abuse in Burn Patients by Using Drug Abuse Screening Test

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Abstract- There has been an increase in the frequency of substance abuse among hospitalized burn injury patients. However, few studies have investigated substance abuse among burn patients. This study was aimed to identify the incidence of substance abuse in burn injury patients using the "Drug Abuse Screening Test" (DAST-20). We determined the validity of DAST-20 in spring 2010. Subsequently, this descriptive study was performed on 203 burn injury patients who fit the study's inclusion criteria. We chose a score of 6 as the cutoff and thus achieved a sensitivity of 89% and a specificity of 85% for the DAST-20. During the study, we gathered demographic data, burn features and DAST-20 results for all patients. Patients with scores of 6 or more were considered to be substances abusers. A statistical analysis was conducted using SPSS v16 software. According to the DAST-20 results, 33% of the patients were in the user group. The mean score of DAST-20 was significantly higher among users than it was among nonusers ($P<0.05$). The level of substance abuse was severe in 77% of users. No significant differences were found among the substances, with the exception of alcohol. Substance abuse is an important risk factor for burn patients. In addition, this study showed that DAST-20 is a valid screening measure for studies on burn patients.

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Introduction

Previous studies have shown that substance abuse is common among burn injury patients (1). Furthermore, studies by Brezelet *et al.*, and Kelly *et al.*, have shown that morbidity, length of hospital stay and care expenses among substance or alcohol abuse burn patients are higher than they are among non-abusers (2,3). Substances abuse causes a 20% increase in the length of hospital stays in burn patients (4). Previous studies have reported that the incidence of alcohol or substance abuse in this group is between 7% and 15% and that alcohol abuse is more common than drug abuse in this patient group. Multiple studies have found that between 3% and 5% of the burn patients admitted to the hospital are drug abusers (3,5). Alcohol and drug abuse is recognized as a risk factor for burn injury (6-9). The presence of alcohol or drugs, which impair judgment, was the strongest independent risk factor for death in the case of a fire (10). Despite significant attention to the role of alcohol

in burn injury (4,11,12), few articles have investigated substance abuse and the role of addiction in burn injury (13). However, the number of burn injury patients who abused drugs prior to their injuries has increased in recent years (13).

In the few available studies, researchers diagnosed drug abuse using patients' own reports and did not verify the patients' claims with drug tests. Today, there is a need for a complete prevention program to decrease the incidence of burn injury and its complications. For this reason, we should identify all related risk factors. Based on experience with burn patient care and a brief study, we observed a high incidence of substance abuse in burn patients who were admitted to the Motahary Burn Center (the largest burn center in the country). Thus, we decided to study the prevalence of substance abuse in our patients using one of available screening tests: DAST-20. We anticipated that the data from this study would help us to establish a burn prevention program for substance abusers.

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Materials and Methods

This descriptive study was performed from April-June 2010 in the Motahary hospital. The participants were patients above the age of 12 years who suffered acute burn injuries with different percentage burn area. The patients were hospitalized after being admitted to the emergency ward. All the patients were completely conscious and able to answer the DAST-20 questionnaire (inclusion criteria). Patients below the age of 12, who were admitted for reconstructive surgery or with low levels of consciousness (GCS<13), were omitted from the study (exclusion criteria).

After admission, diagnostic and therapeutic care was performed according to the study protocol for all patients.

The validity of DAST-20 was assessed in a pilot study. After evaluating the inclusion and exclusion criteria, we categorized 21 patients of the initial 60 as suffering from substance abuse. All patients reported the amount and kind of substances they used. Because of the number of consumed substances, the patients' acute condition and morphine prescriptions, it was impossible to use laboratory methods to confirm the patients' answers. Thus, we trusted the patients' answers. A total of 19 patients were specified as true positive (substances abuser), and 41 were classified as true negative (non abuser). By performing DAST-20 and choosing 3 as a cutoff score, we achieved a test accuracy of 94% in specifying the percent of true positive or sensitivity. The specificity of the percentage of true negatives was 76%. When we increased the cutoff score to 6, sensitivity reached 89%, and specificity reached 85%.

Sensitivity= True positive/ (True positive+False negative)

Specificity= True negative/ (True negative+False positive)

Two questionnaires were created for the main part of the study. Both questionnaires were completed after the

patient's vital signs were stabilized and the patient had regained full consciousness.

The first questionnaire included questions about patients' age, sex, marital status, job, educational status and kind of substance abuse.

The second questionnaire was the "Drug Abuse Screening Test" (DAST-20) and included 20 yes/no questions. This test is scored by allocating one point to each yes answer, except for questions 4 and 5, for which we allocated a score of 1 for no answer.

All of the patients were informed about the DAST-20. This test was carried out after the patients were assured that their information would be completely confidential. Performing this test did not cause delays in patients' standard burn care. According to the standard defined for this study, and to increase the specificity of the test, we defined the patients with a score of 6 as part of the "substances" group.

We gathered the data for this study over a period of 3 months and performed the statistical analysis was SPSS v16 software (SPSS, Chicago, Inc.). The quantitative variants were compared with the independent sample t-test, and the nonparametric variants were compared with the Fisher's exact test. This research was approved by the Tehran University of Medical Sciences Research Subjects Review Board.

Results

Two hundred and three patients met the inclusion criteria during the study period. Our analysis of the questionnaires showed that 68 patients (33%) were users and that 135 patients (77%) were non-users. The mean age, total body surface area burned (TBSA), length of hospital stay and DAST-20 score in the user group were higher than the values in the non-user group. The difference in DAST-20 score was the only significant difference between the two groups ($P<0.05$) (Table 1 and Figure 1).

Table 1. Comparison of the age, TBSA %, DAST Score, the mean of hospital stay between user and non-user groups.

	User 68	Non-user 135	P- value
Age(Year)	37.67±14.96	33.53±15.34	$P>0.05$
TBSA ^a %	35.74±23.11	29.67±20.23	$P>0.05$
DAST score ^b	16.29±3.17	1.39±1.81	$P<0.05$
Hospital stay (days)	18.72±15.31	16.52±14.21	$P>0.05$

$P<0.05$: There was statistically significant difference between two groups based on the Independent sample t-test

$P>0.05$: There was no statistically significant difference between two groups based on the Independent sample t-test

a: Total BodySurface area (Percentage of burn), b: Drug Abuse Screening Test

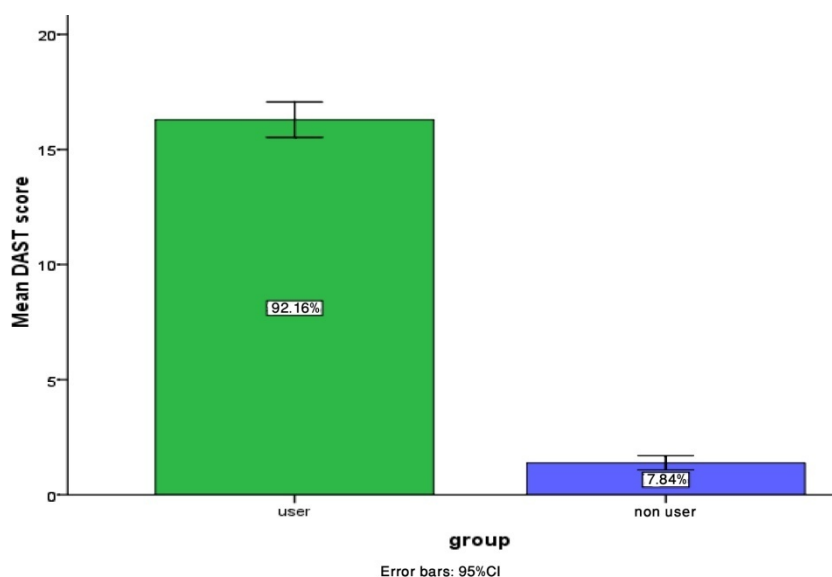


Figure 1. Comparison of the mean DAST scores between user and non-user groups.

A total of 91.18% of the user group were men, and alcohol consumption was significantly higher in this group (77.8%, $P < 0.05$). There were no statistical differences between the two groups for marital status, inhalation injury and mortality rate (Table 2 and Figure 2).

About 15% of the patients in each group were university educated, and there was no significant difference in education level between the two groups. The most important factors that caused burn injury were flames and gas explosions (80% and 68%, respectively).

Table 2. Comparison of the percentage of male, married, alcohol consumption, inhalation injury and death between user and non-user groups.

	User 68	Non-user 135	P-value
Male (%)	91.18	62.96	$P < 0.05$
Married (%)	58.82	62.22	$P > 0.05$
Alcohol consumption (%)	41.17	5.92	$P < 0.05$
Inhalation Injury (%)	23.52	17.29	$P > 0.05$
Death (%)	13.23	15.55	$P > 0.05$

$P > 0.05$: There was no statistically significant difference between two groups based on non-parametric Fisher's exact test

$P < 0.05$: There was statistically significant difference between two groups based on non-parametric Fisher's exact test

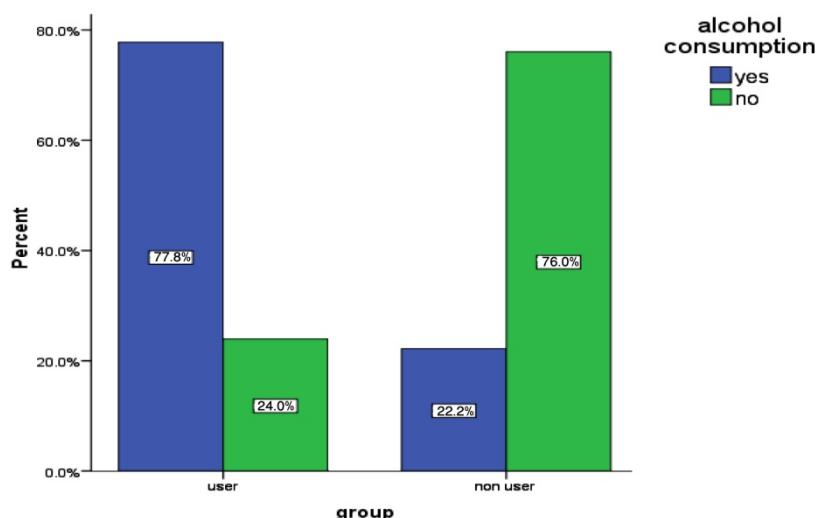


Figure 2. Comparison of the percentage of the Alcohol consumption between user and non-user groups.

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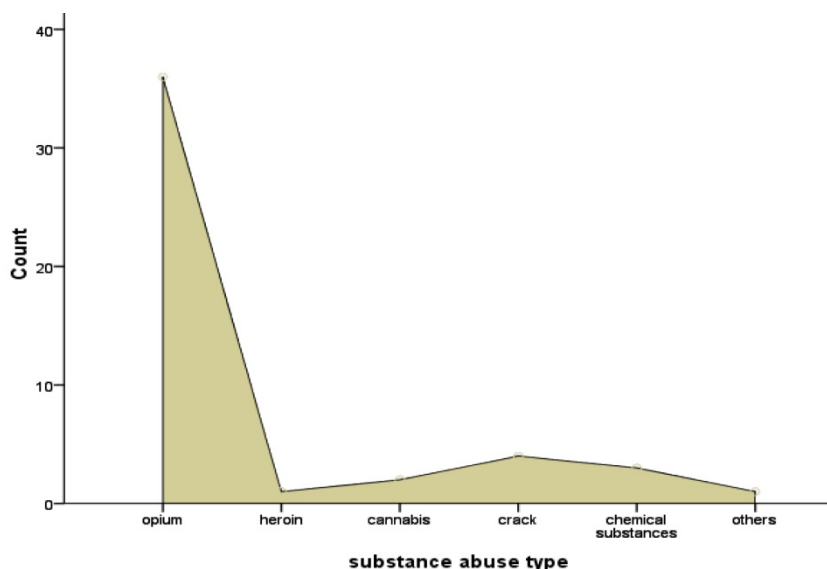


Figure 3. The prevalence of the substances that were abused in the user group.

The most commonly abused substance in this study was opium (55%) as shown in Figure 3.

According to the results of the DAST-20, 77% of the patients in the user group exhibited a severe level of drug abuse (Table 3 and Figure 4).

All (100%) of the patients answered yes to questions 1, 2, 3 and 17, and 100% answered no to question 16. Thus, none of these questions affected the patients' scores.

Table 3. Comparison of the severity level of the substances abuse between user and non-user groups.

	User 35	Non-user 135	P-value
Zero level (%)	0	97	$P < 0.05$
Low level (%)	0	3	$P < 0.05$
Moderate level (%)	8	0	$P < 0.05$
Substantial level (%)	15	0	$P < 0.05$
Sever level (%)	77	0	$P < 0.05$

$P < 0.05$: There was statistically significant difference between two groups based on non-parametric Fisher Exact test

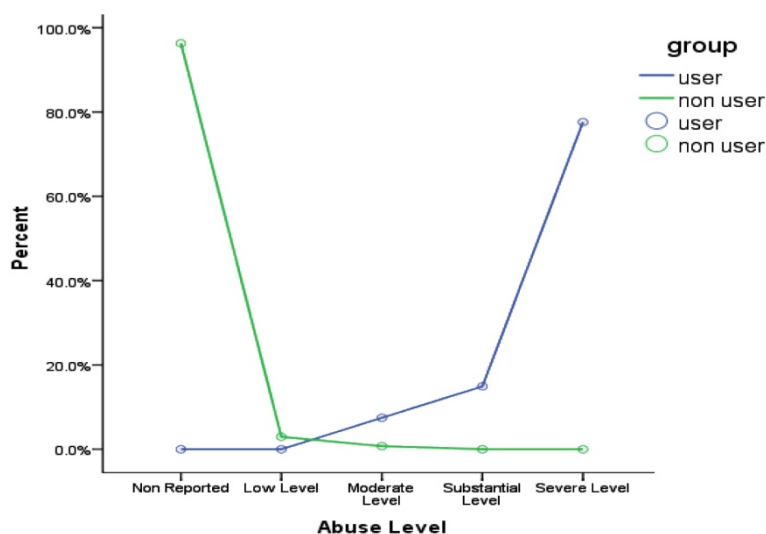


Figure 4. Comparison of the severity level of the substance abuse between user and non-user groups.

Table 4. The analysis of DAST-20 in user group (68).

DAST-20	YES/NO (%)
1-Have you used drugs other than those required for medical reasons?	YES (100%)
2- Have you abused prescription drugs?	YES (100%)
3- Do you abuse more than one drug at a time?	YES (100%)
4-Can you get through the week without using drugs?	NO (89.7%)
5-Are you always able to stop using drugs when you want you?	NO (89.7%)
6- Have you had "blackouts" or "flashback" as a result of drug use?	YES (94.1%)
7- Do you ever feel bad or guilty about your drug use?	YES (98.5%)
8-Dose you spouse (or parents) ever complain about your involvement with drugs?	YES (94.1%)
9- Has drug abuse created problems between you and your spouse or your parents?	YES (95.5%)
10-Have you lost friends because of your use of drugs?	YES (88.2%)
11- Have you neglected your family because of your use of drugs?	YES (91.1%)
12- Have you been in trouble at work because of your use of drugs?	YES (97.1%)
13- Have you lost a job because of drug abuse?	YES (66.1%)
14- Have you gotten into fights when under the influence of drugs?	YES (82.2%)
15- Have you engaged in illegal activities in order to obtain drugs?	YES (5.9%)
16- Have you been arrested for possession of illegal drugs?	YES (0.00%)
17- Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?	YES (100%)
18- Have you had medical problems as a result of your drug use(e.g. memory loss, hepatitis, convulsion,bleedingetc)?	YES (91.1%)
19- Have you gone to anyone for help for a drug problem?	YES (86.7%)
20- Have you been involved in a treatment program especially related to drug use?	YES (83.8%)

Discussion

The results of this study were not surprising because a high percentage of the burn injury patients who attend our clinic have a history of substance abuse. More than 20 years after the Swenson *et al.*, study (13), we found several articles about the role of substance abuse in burn injuries (5,14-16). Several studies have diagnosed alcohol and substances abuse based on patients' history and blood tests (5,15).

Because of the large number of available substances and drugs, it is more difficult to diagnose substance or drug abuse by blood or urine tests than it is to diagnose alcohol abuse. On the other hand, diagnosis by self-reported history requires more patient cooperation. It is essential to use valid psychological tests to obtain true answers. Most patients answer truthfully about smoking (17,18), but information about alcohol and substance abuse cannot be reliably obtained with direct questions (19). Although addiction has become accepted as an

illness in recent years, the answers of alcohol and substances abusers to direct questions should still be taken with some caution. However, valid screening tests with patient questions should be performed. The Michigan Alcoholism Screening Test (MAST) was developed in the early 1970s, and the CAGE questionnaire was developed in the 1980s as screening tests for the diagnosis of alcohol abuse (20,21). However, these tests were not suitable to diagnose substance abuse, so two integrative tests were formed for this purpose. These tests were the Short Michigan Alcoholism Screening Test (SMAST), which has low sensitivity and specificity and CAGE-AID test, which has more sensitivity but is not as specific (22). The DAST is a self-evaluation questionnaire that can be completed in less than 10 minutes. The DAST is a modification of the MAST (14) and has 4 versions: DAST-28, DAST-10, DAST-20 and DAST-A. The DAST has been used to assess drug and substance abuse among a variety of groups, including people with drug and alcohol problems (23), psychiatric patients (24), patients with adult attention

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deficit/hyperactivity disorder (ADHD) (25), narcotics users (26), female offenders (27), inpatient substance abusers (28) and mothers of young children with substance abuse problems (29). According to the Skinner survey, the DAST-20 correlates well with the DAST-28 ($r=0.99$) (14), so we chose to use the DAST-20 in this study. The psychometric properties of this test were examined in 2006, and it was found that the DAST is reliable and has high sensitivity and specificity (30).

The correct screening laboratory tests for substances abuse diagnosis should be noninvasive, low cost, easily available and highly reliable. Although some screening laboratory tests for the diagnosis of alcohol abuse have acceptable sensitivity and specificity, it is unfortunately not possible to screen substance abusers with only one laboratory test because of the variation in the abused substances. Performing several tests is time-consuming, invasive and expensive, making this approach impractical for trauma patients. Because it is necessary to use repeated doses of morphine sulfate for pain relief in burn injury patients, laboratory tests are unreliable.

We measured the validity of the DAST-20 in a pilot study. We chose 6 as a cutoff score to increase the specificity of the test and to accomplish the purposes of this study. A specificity of 85% and a sensitivity of 89% were obtained for the DAST-20 test. Because of the high accuracy and reliability of the DAST-20, the remaining screening was performed with this test.

The mean DAST-20 score was 16.29 in the user group, indicating the intensity of substance abuse in this group.

A total of 77% of the patients in the user group had a severe level of substance abuse. All (100%) of the patients in the user group answered yes to questions 1, 2, 3, and all the patients in this group had confirmed substance abuse.

One of the problems uncovered by the results of the DAST was that we could not determine whether the abused substances were legal drugs or illegal substances. This test cannot differentiate the abuse of marijuana, heroin and hallucinogenic chemicals from the abuse of therapeutic drugs such as codeine and diazepam.

More than 90% of the patients in the user group received a score on questions 4, 5, 6, 7 and 17. This finding showed that these patients have a severe dependency on substances.

More than 80% of patients found that substance abuse caused problems in their familial, social and

occupational relations. Furthermore, 86% of the patients indicated that they want to find a cure to recover from substance dependence (Question 19). It should be noted that 83% of the patients had already attempted to cease drug use but were unsuccessful.

More than 95% of the patients in the user group answered no to questions 15 and 16 because they were not professional criminals.

According to this research, addiction is an important risk factor among our patients. It is necessary to identify the patients who are substance abusers during hospitalization to prevent symptoms of withdrawal syndrome and to ensure proper referral to valid drug use cessation centers.

Unlike the findings in Grombmyer *et al.*, study (5), we did not find any significant difference between the users and non-users in length of hospital stays and complications.

As a result of impaired consciousness, at least 25% of the patients faced problems while using substances. Another study needs to be performed to determine the correlation between severity of burn injury and substance abuse.

Alcohol consumption in the user group was significantly higher than it was in the non-user group. The amount of alcohol used and patients' dependency on alcohol were not studied, and no special tests (such as CAGE) were performed. Because there was no report about alcohol consumption on the day of admission, the blood level of alcohol was not measured in any patients. There were no alcohol withdrawal syndrome signs or symptoms in our patients. Thus, we think that alcohol abuse is not an important risk factor in our patients. However, it is necessary to perform another study to determine the prevalence of alcohol abuse in our burn injury patients.

We propose that burn injury patients do not reflect the actual level of drug abuse in society. Burn injury risk factors have to be recognized separately in each country to prevent burn injuries. We must pay attention to substance abuse as an important risk factor in burn injuries during comprehensive burn prevention programs. Substance abuse was an important risk factor in our patients with burn injury.

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References

- Jones JD, Barber B, Engrav L, Heimbach D. Alcohol use and burn injury. *J Burn Care Rehabil* 1991;12(2):48-52.
- Brezel BS, Kassenbrock JM, Stein JM. Burns in substance abusers and in neurologically and mentally impaired patients. *J Burn Care Rehabil* 1988;9(2):169-71.
- Kelley D, Lynch JB. Burns in alcohol and drug users result in longer treatment times with more complications. *J Burn Care Rehabil* 1992;13(2 Pt 1):218-20.
- Thombs BD, Singh VA, Halonen J, Diallo A, Milner SM. The effects of preexisting medical comorbidities on mortality and length of hospital stay in acute burn injury: evidence from a national sample of 31,338 adult patients. *Ann Surg* 2007;245(4):629-34.
- Grobmyer SR, Maniscalco SP, Purdue GF, Hunt JL. Alcohol, drug intoxication, or both at the time of burn injury as a predictor of complications and mortality in hospitalized patients with burns. *J Burn Care Rehabil* 1996;17(6 Pt 1):532-9.
- Howland J, Hingson R. Alcohol as a risk factor for injuries or death due to fires and burns: review of the literature. *Public Health Rep* 1987;102(5):475-83.
- Brodzka W, Thornhill HL, Howard S. Burns: causes and risk factors. *Arch Phys Med Rehabil* 1985;66(11):746-52.
- MacArthur JD, Moore FD. Epidemiology of burns. The burn-prone patient. *JAMA* 1975;231(3):259-63.
- Hunt JL, Arnoldo BD, Purdue GF. Prevention of burn injuries. In: Herndon DN, editor. *Total Burn Care*. 3rd ed. China: Saunders Elsevier Inc 2007. p. 34-5.
- Runyan CW, Bangdiwala SI, Linzer MA, Sacks JJ, Butts J. Risk factors for fatal residential fires. *N Engl J Med* 1992;327(12):859-63.
- Choudhry MA, Chaudry IH. Alcohol, burn injury, and the intestine. *J Emerg Trauma Shock* 2008;1(2):81-7.
- Silver GM, Albright JM, Schermer CR, Halerz M, Conrad P, Ackerman PD, Lau L, Emanuele MA, Kovacs EJ, Gamelli RL. Adverse clinical outcomes associated with elevated blood alcohol levels at the time of burn injury. *J Burn Care Res* 2008;29(5):784-9.
- Swenson JR, Dimsdale JE, Rockwell E, Carroll W, Hansbrough J. Drug and alcohol abuse in patients with acute burn injuries. *Psychosomatics* 1991;32(3):287-93.
- Skinner HA. The drug abuse screening test. *Addict Behav* 1982;7(4):363-71.
- Tabares R, Peck MD. Chemical dependency in patients with burn injuries: a fortress of denial. *J Burn Care Rehabil* 1997;18(3):283-6.
- Santos AP, Wilson AK, Hornung CA, Polk HC Jr, Rodriguez JL, Franklin GA. Methamphetamine laboratory explosions: a new and emerging burn injury. *J Burn Care Rehabil* 2005;26(3):228-32.
- Centers for Disease Control (CDC). Cigarette smoking in the United States, 1986. *MMWR Morb Mortal Wkly Rep* 1987;36(35):581-5.
- Fortmann SP, Killen JD, Telch MJ, Newman B. Minimal contact treatment for smoking cessation. A placebo controlled trial of nicotine polacrilex and self-directed relapse prevention: initial results of the Stanford Stop Smoking Project. *JAMA* 1988;260(11):1575-80.
- McNagny SE, Parker RM. High prevalence of recent cocaine use and the unreliability of patient self-report in an inner-city walk-in clinic. *JAMA* 1992;267(8):1106-8.
- Selzer ML. The Michigan alcoholism screening test: the quest for a new diagnostic instrument. *Am J Psychiatry* 1971;127(12):1653-8.
- Ewing JA. Detecting alcoholism. The CAGE questionnaire. *JAMA* 1984;252(14):1905-7.
- Brown RL, Leonard T, Saunders LA, Papasouliotis O. A two-item conjoint screen for alcohol and other drug problems. *J Am Board Fam Pract* 2001;14(2):95-106.
- Gavin DR, Ross HE, Skinner HA. Diagnostic validity of the drug abuse screening test in the assessment of DSM-III drug disorders. *Br J Addict* 1989;84(3):301-7.
- Carey KB, Carey MP, Chandra PS. Psychometric evaluation of the alcohol use disorders identification test and short drug abuse screening test with psychiatric patients in India. *J Clin Psychiatry* 2003;64(7):767-74.
- McCann BS, Simpson TL, Ries R, Roy-Byrne P. Reliability and validity of screening instruments for drug and alcohol abuse in adults seeking evaluation for attention-deficit/hyperactivity disorder. *Am J Addict* 2000;9(1):1-9.
- Skinner HA, Goldberg AE. Evidence for a drug dependence syndrome among narcotic users. *Br J Addict* 1986;81(4):479-84.
- Saltstone R, Halliwell S, Hayslip MA. A multivariate evaluation of the Michigan Alcoholism Screening Test and the Drug Abuse Screening Test in a female offender population. *Addict Behav* 1994;19(5):455-62.
- Bohn MJ, Babor TF, Kranzler HR. Validity of the drug abuse screenings test (DAST-10-) in inpatient substance abusers. *Proceedings of the 53rd Annual Scientific Meeting The Committee on Problems of Drug Dependence Inc DHHS Publication No ADM 921888 NIDA Research Monograph*. Department of Health and Human Services, 1991.

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29. Kemper KJ, Greteman A, Bennett E, Babonis TR. Screening mothers of young children for substance abuse. *J Dev Behav Pediatr* 1993;14(5):308-12.
30. Yudko E, Lozhkina O, Fouts A. A comprehensive review of the psychometric properties of the Drug Abuse Screening Test. *J Subst Abuse Treat* 2007;32(2):189-98.