



# Prevalence of Alcohol Dependence and Abuse in a General Hospital; Sensitivity and Specificity of MAST

Tuncer Okay<sup>1</sup>, Cem Şengül<sup>2</sup>, Çağlar Açıkgöz<sup>3</sup>, Gönül Ozan<sup>1</sup>, Nesrin Dilbaz<sup>1</sup>

<sup>1</sup>Ankara Numune State Hospital, Department of Psychiatry, Ankara

<sup>2</sup>Pamukkale University, Medical Faculty, Department of Psychiatry, Denizli

<sup>3</sup>Sincan State Hospital, Department of Psychiatry, Ankara, Turkey

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## ABSTRACT

**Aim:** Alcohol abuse and dependence is an important public health concern in most countries. It is also a big problem among the hospitalized patients.

**Method:** This study was undertaken to determine the number of the patients with alcohol related problems in a general hospital sample, to compare the prevalence rate among clinics, to determine the sensitivity and specificity of MAST (Michigan Alcoholism Screening Test) for an inpatient sample. The data were collected from 13 inpatient clinics of Ankara Numune Research and Training Hospital.

**Result:** A sample of 800 patients was enrolled in the study. 60 patients were (%7,5) diagnosed alcohol addiction and 11 were (%1,4) diagnosed as alcohol abuse. Alcohol addiction was most common in gastroenterology clinic. MAST sensitivity and specificity were found 0,74 and 0,98 respectively.

**Conclusion:** MAST might be a useful instrument for screening alcohol related problems in a general hospital setting.

**Key words:** MAST, alcohol dependence, alcohol abuse, prevalence

## INTRODUCTION

Alcohol related problems are important public health concern in most countries. Most of the people who drink alcohol are at risk of having alcohol-related problems and their life-threatening consequences. Alcohol and drug use disorders are the most frequent causes of disability among all mental disorders and 12% of the people in western countries suffer from alcohol and drug related disabilities (1). Estimation of the prevalence rates of alcohol use disorders (alcohol abuse and dependence) is crucial among inpatient samples because of high rates of physical comorbidity.

**Correspondence:** Dr. Cem Şengül  
Pamukkale Üniversitesi, Psikiyatri  
Bölümü, Denizli, Türkiye  
Tel: +90 258 4440728-1144  
GSM: +90 532 6450585  
E-mail:acemsen@gmail.com

Alcohol-related morbidity includes not only alcohol abuse and dependence but also damage to liver, pancreas, gastrointestinal tract, heart and central and peripheral nervous systems (2). On the other hand, significant proportions of problems related to alcohol use especially occur in people who are not alcohol dependent (3). In general practice and hospital care, screening alcohol consumption and related problems allow health care professionals to identify individuals who have the risk of alcohol-related consequences. Screening alcohol-related problems usually involves asking the patients about their drinking habits through structured interviews of self-report questionnaires such as CAGE (Cut down, Annoy, Guilt, Eye opener), MAST (Michigan Alcoholism Screening Test), AUDIT (Alcohol Use Disorders Identification Test) and TWEAK (Tolerance, worried, eye-opener, amnesia, K/Cut down) (4,5).

Several studies were undertaken to determine the prevalence of alcohol related problems among inpatient samples in different countries. The results of the National Longitudinal Alcohol Epidemiologic Survey in the United States showed that 15% to 42% of men and 4% to 35% of women admitted to general medical-surgical services have alcohol related problems (6). Alcohol abuse is the leading cause of liver-related mortality in the USA. The health statistics suggest that the number of people suffering from some form of alcoholic liver disease exceeded 2 million. An estimated 900 000 people have cirrhosis and 26 000 of them die each year, among these people at least 40% and perhaps 90% have a history of alcohol abuse (7).

In order to determine the prevalence of current DSM-IV Alcohol- use disorders in short-stay general hospital admissions, Smothers et al designed a multistage probability sample to represent acute care admissions to nonfederal, short-stay, general hospitals. An estimated 1.8 million annual hospital admissions met the criteria for a current DSM-IV alcohol use disorder. Overall prevalence was estimated to be 7.4% among current-drinking related admissions; estimated prevalence was 24.0%. Pair wise comparisons showed significant elevations in the prevalence of alcohol use disorders in current-drinking related admissions who were younger, unmarried, of a lower socioeconomic status, smokers, or drug users (8,9). Interesting finding that had pointed out the data that may be important for further research, treatment, and screening procedures came from a study that was performed by Kouimtsidis and

colleagues in the UK, in which 14% of an inpatient sample was positive for alcohol misuse and people misusing one substance were more likely to be misusing others (10).

In Turkey, until now date only one study has been performed to determine the prevalence of alcohol-use disorders among inpatient samples. In that study involving 500 inpatients in a University Hospital in Ankara, the rate of patients who were still using alcohol was %17.6. The alcohol dependence rate was 3.2% in males and 0.03% in females. The study determined that the alcohol dependency rate was 7 times higher in men among inpatient sample (11). The prevalence rates seem to be lower than Western countries; however, recent epidemiological data indicates that there is an increasing trend in prevalence rates of alcohol-use disorders in general population. Thus, the prevalence estimation of alcohol-use disorders may not represent the current situation (12).

In routine clinical practice, doctors sometimes have difficulties in detecting alcohol related problems in many of their patients (13). In a study by Rumpf, it was pointed out that the physician's detection rate of alcohol related problems could be improved by 10% in general hospital and 20% in general practice through the additional use of a screening questionnaire (14). Among patients detected as alcohol dependent in the general hospital, 38.2% had received no previous help in their life-time and 70.8% did not seek help in the year prior to admission (3). Another study showed that screening the patients for alcohol related problems will help clinician to reach to a less problematic sample with lower motivation to change (15). Based on this evidence it can be claimed that the general hospital can be regarded as a suitable place to provide secondary prevention for the patients that have alcohol related disorders and provides the opportunity to initiate first treatment for a substantial part of alcohol-dependent subjects (15).

An important study that was conducted by Ulrich et al in Germany involved a sample of 1309 inpatients (in six medical clinics and five surgical clinics) aged between 18 and 64, who were followed for one year. The patients were screened for alcohol related disorders by CAGE and MAST questionnaires, the type of medications used in the hospital for the treatment of withdrawal symptoms, laboratory tests like GGT, AST, ALT and MCV, that can be affected by alcohol use. After the first step, a diagnostic

assessment with SCAN (Schedules of Clinical Assessment in Neuropsychiatry) was performed. The authors stated that only 0.4% of the total sample could not be detected by CAGE and MAST. In addition, 2% of the patients that were positive in CAGE or MAST could not be confirmed by SCAN. In the six medical clinics, alcohol abusers or dependents varied between 3.5% and 32.1%. This study showed that screening instruments were sensitive and specific for detecting alcohol-related problems among general hospital cases (16). The objectives of this study were; to determine the number of the patients that have alcohol related problems in a general hospital, to compare the frequencies of alcohol dependence and abuse among clinics and to determine the sensitivity and specificity of MAST for an inpatient sample.

## MATERIALS AND METHODS

### Subjects

The study involved the patients who were admitted to Ankara Numune Research and Training Hospital. The data were collected from eight medical and five surgical clinics from the patients who had been randomly selected out of the patient lists of each clinic. The medical clinics consisted of gastroenterology, immunology, endocrinology, oncology, hematology, neurology, nephrology, and cardiology clinics. The surgical clinics consisted of three general surgical clinics, one orthopedics and neurosurgery clinics. Especially orthopedics and neurosurgery clinics involved trauma patients. In the three general surgical clinics, there were patients with abdominal, thyroid, and peripheral vascular diseases. The intensive care clinics were excluded because almost all of the patients were not able to participate in the study. The informed consents of the patients were obtained, and the tasks of the study were explained to the patients before the study. The consents of clinic directors were also obtained.

Eight hundred patients (age range: 18-65;  $45.59 \pm 13.28$ ) volunteered to enroll in the study. Of the total sample, 50.8% (n:406) were female, and 49.3% (n:394) were male. While 40.6% (n:327) patients were in the medical clinics, 59.4% (n:473) patients were in the surgical clinics.

### Screening And Diagnostic Procedures

MAST questionnaire was administered to all the patients enrolled in the study by two trained psychiatrists and a psychologist, who were not involved in the ongoing care of the patients. A chart review was performed to determine the demographic data, such as age, gender, marital status, occupation, residence, and education of the patients. The questionnaire was performed in the clinics. There was no time limit, and the interviewers helped the illiterate patients by reading the questionnaire. After the administration of the MAST, SCID-I was performed by another trained psychiatrist blinded to the MAST scores of the patients.

### Assessment Tools

#### Michigan Alcoholism Test (MAST)

Michigan Alcoholism Screening Test (MAST), a 25-item questionnaire originally described by Selzer in 1971, is one of these screening tests, which has been extensively validated in several clinical and epidemiological studies (17,18). The 25 yes/no responses are assigned weighted points, and the total score obtained is used to designate the subject as alcoholic or non-alcoholic. A score of 5 points or greater is associated with alcoholism in 80% of the subjects, whereas a score of 10 and greater is 100% associated with alcoholism. Validity and reliability of Turkish version of the MAST was made by Coskunol et al (19).

#### SCID-I

The Structured Clinical Interview for DSM-IV axis I Disorders (SCID-I) is a clinician-administered semi structured interview for use on psychiatric patients or with non patient community subjects who are undergoing evaluation for psychopathology. The SCID-I was developed to provide broad coverage of psychiatric diagnosis according to DSM-IV (20). Reliability of Turkish version was made Ozkurkcugil et al (21).

### Statistical Analysis

Descriptive statistics were used to find the sociodemographic characteristics, distribution of patients among clinics and the prevalence of alcohol-related diagnosis. Categorical variables were tested by  $\chi^2$  analysis and continuous variables were tested by independent samples t test.

**Table 1.** Sociodemographic characteristics of the sample

		Number (n)	%
GENDER	Male	394	49,2
	Female	406	50,8
AGE	15-24	77	9.6
	25-34	127	15.9
RESIDENTIAL AREA	35-44	187	23.4
	45-54	182	22.8
	55-64	227	28.4
	Urban	627	78,4
MARITAL STATUS	Rural	173	21,6
	Single	84	10.5
EDUCATION	Married	608	76
	Divorced or widow	108	13.5
	Illiterate	180	22,5
	Literate	17	2,1
Primary school	High school	93	11,6
	University	27	3,4

In addition, the sensitivity and specificity analyses of MAST were performed according to SCID diagnosis taken as a gold standard. Taking 5 points as a cut-off value, the patients were distinguished as false negative, true positive, false positive, and true negative.  $P<0.05$  was considered significant. The sensitivity and specificity analyses were performed based on the formulas below:

$$\begin{aligned} \text{Sensitivity} &= \frac{\text{true positive}}{\text{true positive} + \text{false negative}} \times 100 \\ \text{Specificity} &= \frac{\text{true negative}}{\text{true negative} + \text{false positive}} \times 100 \end{aligned}$$

## RESULTS

The number of the total eligible patients was 800. The patients who were unable to participate (37 patients), refused screening procedure (23 patients), and were discharged before the screening procedure could be finished (44 patients) were excluded from the study. The socio-demographic characteristics of the patients are provided on Table 1. Three hundred and twenty-seven (40.6%) patients were hospitalized in the medical clinics and 473 (59.4%) patients were hospitalized in the surgical clinics. Distribution of patients among clinics has been presented on Figure 1.

The gastroenterology clinic had the highest ratio of patients (13%), while the endocrinology clinic had the lowest ratio (2%) of the patients among the medical clinics. As for the surgical clinics, orthopedics department had the highest ratio of the patients (29%) and the neurosurgery clinic had the lowest ratio (1%) of the patients (Figure 1). The mean age of the patients was  $45.32 \pm 13.12$  in medical clinics and  $45.78 \pm 13.40$  in the surgical clinics. There was no significant age difference between the medical and surgical clinics ( $p<0.05$ ).

Out of 800 inpatients, 735 (91.9%) patients had scored 4 or less and were designated as non-alcoholic based on the results of MAST (MAST negative). In the MAST negative group, 3 (0.4%) patients were diagnosed as alcohol abusers, and 15 (1.9%) patients were diagnosed as alcohol dependent cases according to the results of SCID-I. Sixty-five patients (8.1%) scored 5 or higher on the MAST and were designated as MAST positive, among whom 40 (5%) patients had a score of 10 or higher with a nearly 100% specificity for alcoholism. All of the patients of this group were diagnosed as having either alcohol abuse or alcohol dependence problems. Thirty-eight patients were diagnosed as alcohol dependent (4.8%), and 2 patients were diagnosed as alcohol abusers (0.3%). The remaining 25 patients had scores of 5 to 9 on the MAST, also matching to the cutoff values for a positive result. In this group, 7 (0.9%) patients had alcohol dependence, whereas 6 (0.8%) patients received a diagnosis of alcohol abuse and 12 (1.5%) patients were not diagnosed according to SCID-I (Table 2). The sensitivity and specificity of MAST questionnaire were 0.74 and 0.98 respectively based on the cut-off score of 5. Of the eligible sample, 60 (7.5%) patients were diagnosed as alcohol dependent and 11 (1.4%) patients were diagnosed as alcohol abusers (Table 2). All of the patients diagnosed as alcohol

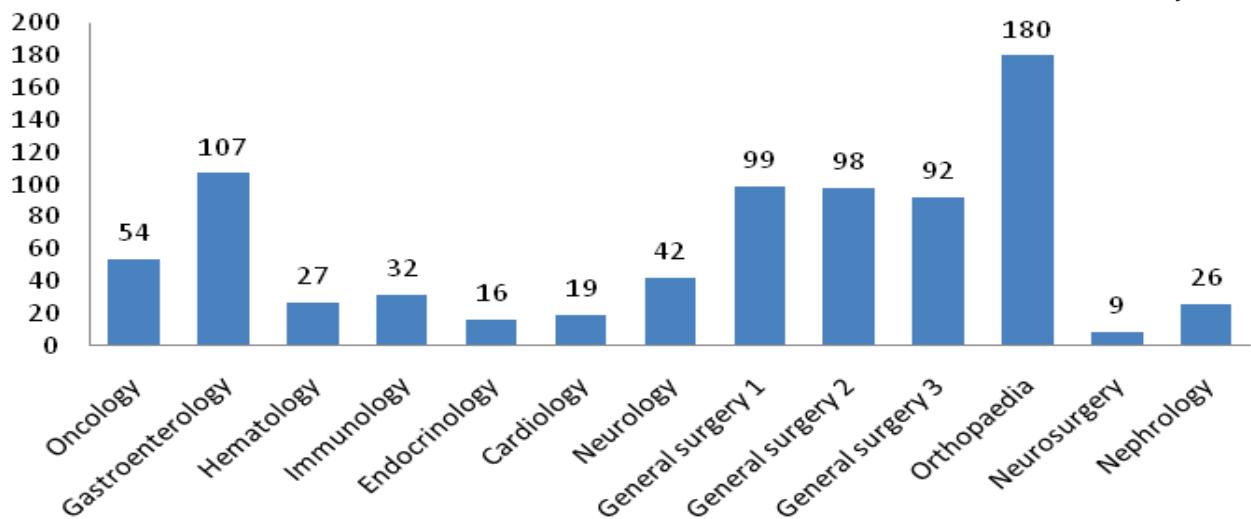


Figure 1. Distribution of the patients among clinics

dependent were male. Only one female patient was diagnosed as an alcohol abuser. When the SCID diagnoses were evaluated according to distribution of patients in each department, no patients had alcohol-related diagnosis in hematology, immunology and neurosurgery clinics. The most frequent alcohol related diagnoses were in the gastroenterology clinic (18 alcohol dependence, 2 alcohol abuse) (Table 3). There were statistically significant differences when the clinics were compared for SCID diagnoses ( $p<0.05$ ). The rates of alcohol dependence in the seven medical clinics ranged from 0% to 16.8%, and the rates of alcohol abuse ranged between 0% and 12.5%. Among the surgical clinics, the rates of alcohol dependence ranged from 0% to 10.9% and abuse rates were between 0% and 2.2%. Whereas one of the general surgery clinics had the highest ratio of alcohol dependents (10.9%), orthopedics clinic had the lowest

ratio for alcohol abusers (2.2%), (Table 3). No statistical difference seen between the medical and surgical clinics, considering the prevalence of alcohol dependence (9% versus 6.5%) and abuse (1.9% versus 1%).

## DISCUSSION

One of the objectives of this study was to estimate the prevalence of alcohol dependence and abuse in a general hospital. Of our sample, 7.5% (n:60) of the patients were diagnosed as alcohol dependent, while 1.4% (n:11) of the patients diagnosed as alcohol abusers in the light of SCID-I results. The prevalence was significantly higher among males than among females. Data from the previous studies show that the proportion of alcohol dependence in hospitalized patients ranges 10% to 20% (22). In our patients, the prevalence of alcohol-related problems seems to be lower than it was in the previ-

Table 2. Distribution of SCID diagnosis of the patients among MAST scores

MAST SCORES	SCID DIAGNOSIS						TOTAL	
	Alcohol dependence		Alcohol abuse		Not diagnosed			
	n	%	n	%	n	%	n	%
0-4(MAST negative)	15	1.9	3	0.4	717	89.6	735	91.9
5-9(MAST positive)	7	0.9	6	0.8	12	1.5	25	3.1
>10(MAST positive)	38	4.8	2	0.3	0	0	40	5
TOTAL	60	7.5	11	1.4	729	91.1	800	100

Table 3. Distribution of SCID diagnosis of the patients in each clinic.

	SCID DIAGNOSIS				TOTAL	
	Alcohol dependence		Alcohol abuse		Not diagnosed	
CLINIC	N	%	N	%	N	%
Oncology	2	3.7	1	1.9	51	94.4
Gastroenterology	18	16.8*	2	1.9	87	81.3
Hematology	0	0	0	0	27	100
Immunology	0	0	0	0	32	100
Endocrinology	2	12.5	2	12.5	12	75
Cardiology	2	10.5	0	0	17	89.5
Neurology	2	4.8	0	0	40	95.2
Nephrology	3	11.5	1	3.8	22	84.6
General surgery 1	3	3	0	0	96	97
General surgery 2	6	6.1	0	0	92	93.9
General surgery 3	10	10.9	1	1.1	81	88
Orthopedic	12	6.7	4	2.2	164	91.8
Neurosurgery	0	0	0	0	8	100
						8

$\chi^2$  test P<0.05, comparison of rates of SCID diagnosis of patients among clinics, \* Most frequent alcohol related diagnosis

ous studies performed in other countries; on the other hand, the prevalence rate of our patients might have been affected by the rates of alcoholism among general Turkish population. In the Turkish Mental Health Profile study, which was performed on the general population between 1995 and 1996, the alcohol dependency rates were detected as 1.7% for men and 0.1% for women based on the results of CIDI (23). In an epidemiological study that had been performed among general population in Turkey, 3.6% of the population had equal or more than 2 points in CAGE that points out risk for this group. According to the results of this study, almost 2.5 fold of the general population that is nearly 9% of the inpatients had alcohol related diagnosis (24). These data are nearly confirmed by our results (alcohol dependence: 7.5%, alcohol abuse: 1.4%).

A striking finding of our study was that there was only one female patient who was diagnosed as having alcohol-related problem. In our clinical practice, there is a male dominance in alcohol-related tendencies. We think that cultural factors are playing an important role on the women's' drinking habits in Turkey, but new data indicate that especially in the young population, alcohol consumption rates are increasing in metropolitan areas where modernization process dominates (25,26).

We used only MAST as a screening questionnaire, and considering the SCID interview as a gold standard, 2.2% (n:18) of the patients could not be detected by MAST. The MAST is relatively sensitive and specific for DSM-diagnosed alcohol abuse or dependence and this questionnaire has some limitations as a screening instrument such as: an emphasis on symptoms of dependence rather than early drinking problems, lack of information on level and pattern of alcohol use, and failure to distinguish current from lifetime problems (27). In our sample, the sensitivity and specificity of the MAST questionnaire were 0.74 and 0.98 respectively. Because of a tendency of the patients to deny some symptoms, few symptoms might have been overlooked during MAST, since it's a self-rating instrument. The alcohol-related problems of 18 patients were detected by SCID interview after establishing a good doctor-patient relationship. However, this may not be sufficient for all patients. As was done by Ulrich et al. the two-step diagnostic procedure would be better for estimation (MAST+CAGE). Clinical observation and anamnesis in combination with other screening questionnaires, biochemical and hematological markers would be very effective at detecting problem drinking (16,28,29).

There was a considerable variation between the clin-

ics in our study. In the medical clinics, the sample size of cardiology (n:16) and endocrinology (n:19) clinic was small. Thus, the prevalence rates of alcohol related problems among these clinics are not as reliable as the prevalence rates of other clinics. This limitation was also encountered in neurosurgery clinic (n:8) among the surgical departments. When the prevalence rates were compared with the study of Ulrich et al.; similarly the abuse rates were found to be lower than dependence rates. For the whole sample, the prevalence rates were lower in our sample, and also the rates were higher in the gastroenterology clinic (16).

In conclusion, alcohol abuse and addiction were generally well diagnosed and treated in psychiatry clinics. But alcohol related problems could not be recognized easily in general hospital and emergency clinics. Researchers were suggesting screening tests and biological markers for detection of alcohol related problems in these settings. We found MAST as a sensitive and specific instrument for detecting alcohol related problems and MAST might be a useful instrument for screening alcohol related problems in general hospital settings.

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