



Reliability and Validity of the Turkish Version of the Addiction Severity Index in Male Alcohol Dependents

Bağımlılık Şiddetini Belirleme Ölçeği'nin Erkek Alkol Bağımlılarında Güvenirlik ve Geçerlik Çalışması

Hatice DEMİRBAŞ¹, İnci ÖZGÜR İLHAN², Yıldırım Beyatlı DOĞAN², Ayşe CANATAN³

¹Gazi University Faculty of Arts, Department of Psychology, Ankara, Turkey

²Ankara University Faculty of Medicine, Alcohol and Substance Abuse Treatment Unit, Ankara, Turkey

³Gazi University Faculty of Arts, Department of Sociology, Ankara, Turkey

ABSTRACT

Introduction: We aimed to evaluate the psychometric characteristics of the Turkish translation of the Addiction Severity Index (ASI) in 115 male alcohol-dependent patients.

Method: The reliability of the instrument was assessed by measuring test-retest, interrater and internal reliabilities. In the validity analysis, the correlation coefficients between corresponding severity ratings and composite scores of each subscale and concurrent validity were assessed. Moreover, the discriminant validity and concurrent validity scores were calculated.

Results: The test-retest reliability of the ASI scores ranged from .79 to .91. The interrater reliability assigned by three raters was high (.74 to .99). Cronbach's alpha coefficient for internal consistency was .85 for all scales, and it varied between .64 and .77 for the subscales. The Beck Depression Inventory moderately correlated with the Psychiatric status, and the MacAndrew Alcoholism Scale correlated with the Alcohol and Drug Use subscales of the Addiction Severity Index (ASI). The correlation coefficient was .91 for the alcohol use subscale.

Conclusion: The results obtained in this study suggest that the Turkish version of the ASI could be used as a reliable and valid instrument in alcohol-dependent patients. (*Archives of Neuropsychiatry 2014; 51: 216-221*)

Key words: Addiction Severity Index, alcohol dependence, validity, reliability

Conflict of interest: The authors reported no conflict of interest related to this article.

ÖZET

Giriş: Bağımlılık Şiddetini Belirleme Ölçeği'nin (BŞBÖ) Türkçe formunun psikometrik özelliklerini değerlendirmek amacıyla 115 alkol bağımlısı erkek hastada değerlendirmek amaçlanmıştır.

Yöntem: Ölçeğin güvenirliliği; test-tekrar test, görüşmeciler arası güvenirlilik ve iç tutarlılık güvenirlilik katsayısı ile değerlendirilmiştir. Geçerlik analizinde, ölçeklerin bileşik puanlarının şiddet puanlarıyla korelasyonları hesaplanmış ve benzer ölçekler geçerliliği belirlenmiştir. Ayrıca ayırt edici geçerlik ve ölçüte dayalı geçerlik puanları hesaplanmıştır.

Bulgular: Bağımlılık Şiddetini Belirleme Ölçeği'nin test-tekrar test güvenirlilik puanları korelasyonları 0,79-0,91 arasında yer almaktadır. Üç hakemin değerlendirmesinden oluşan görüşmeciler arası güvenirlilik yüksek (0,74-0,99) bulunmuştur. İç tutarlılık korelasyon katsayısı, tüm ölçek için 0,85 ve alt ölçekler için 0,64-0,77 arasında değişmektedir. Beck Depresyon Envanteri ile BŞBÖ'nün Psikiyatrik alt ölçeği, Mac Andrew Alkolizm Ölçeği ile BŞBÖ'nün Alkol kullanımı alt ölçeği ile arasındaki korelasyon orta düzeydedir. Alkol kullanım alt ölçeği korelasyon katsayısı 0,91'dir.

Sonuç: Bu çalışmanın bulguları, Bağımlılık Şiddetini Belirleme Ölçeği'nin Türkçe formunun, alkol bağımlısı hastalarda kullanılabilir ve geçerli ve güvenilir bir araç olduğunu göstermektedir. (*Nöropsikiyatri Arşivi 2014; 51: 216-221*)

Anahtar kelimeler: Bağımlılık Şiddeti İndeksi, alkol bağımlılığı, güvenirlilik, geçerlilik

Çıkar çatışması: Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemişlerdir.

Introduction

Alcohol dependence can be defined as a network of problems in terms of biological, psychological, genetic and socio-cultural factors (1,2). It leads to serious complications in health, productivity and social life (3,4). Alcohol use disorders constitute an increasingly significant clinical problem and, specific intervention schedules are required for every single patient. Such intervention schedules require the determination of severity of problems related to consequences of alcohol dependence. On the other

hand, to initiate clinical treatment trials and to evaluate results of treatment, an appropriate way of measurement is essential. Thus, the Addiction Severity Index (ASI) is an appropriate instrument for the following clinical purposes: i) to determine problem areas, ii) to provide a structured interview technique, iii) to assess subjective need for treatment in various areas.

The ASI is one of the most widely used tools in substance abuse settings and in addiction research. The ASI was developed in 1980 by McLellan et al. (5). A modified version, the ASI-5 was

Correspondence Address/Yazışma Adresi

Hatice Demirbaş, Gazi Üniversitesi Edebiyat Fakültesi, Psikoloji Anabilim Dalı, Ankara, Türkiye

Gsm: +90 537 398 50 80 E-mail: demirbashatice@hotmail.com **Received/Geliş tarihi:** 20.07.2012 **Accepted/Kabul tarihi:** 05.12.2012

©Copyright 2014 by Turkish Association of Neuropsychiatry / ©Telif Hakkı 2014 Türk Nöropsikiyatri Derneği

introduced in 1992. The ASI is a semi-structured interview for substance abuse assessment and treatment planning. "One of the things that distinguishes the ASI from most other addiction assessment tools is its focus on the "big picture". Instead of just considering the client's substance use, the ASI also aims its spotlight on the individual's medical, employment, legal, family, social and psychiatric status. This wide angle view is designed to help clinician and patient to get a better understanding not just of the substance use, but also other problems that affect the client and his or her recovery" (6). The most important function of the ASI has been in breaking down the general resistance of treatment professionals against the collection of systematic data. Mental health professions generally use the ASI for monitoring progress, outcomes and to develop treatment plans (7,8,9).

According to the literature, the ASI has been translated into a number of languages and adapted for use in various national circumstances (8,10,11,12,13,14,15). In the present study, we aimed to evaluate the psychometric characteristics of the Turkish translation of the Addiction Severity Index-Fifth Edition (ASI) in alcohol dependent patients.

Method

Subjects

The sample consists of 115 consecutively admitted male patients diagnosed with alcohol dependence according to the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria). Subjects with a diagnosis of psychotic disorder or organic psychiatric disorder were excluded from the study. Only male patients were included in the sample, as the number of female patients who had applied for treatment was few. The present study was approved by the Ankara University Psychiatry Clinic, Alcohol and Substance Abuse Treatment Unit. Informed consent was obtained from the participants after giving information about the study procedure.

The mean age±standard deviation (sd) of the sample was 43.0±8.1 years with an age range of 18 to 65 years. Seventeen patients were in 18-34 age group, whereas 51 patients were in 35-54 and 47 patients were in 55-65 age groups. The characteristics of the patients are given in Table 1.

The age at first alcohol use ranged between 14 and 17, and 31.3% of the patients reported that they had first drunk alcohol at the age of 19 or later. Of the whole population, 32.2% reported that they used to consume around 16 drinks per day and 21.7% used to consume around 8 drinks per day. Since a 5-year period had been reported to be the optimal length of time to alcohol dependence (16), the data of the present study were based on 5-year intervals for each patient. Sixty percent of the sample were determined to consume alcohol at the dependence level for more than 10 years, whereas 28.7% and 11.3% have been consuming alcohol at dependence level for 6 to 10 years and for less than 5 years, respectively. At the time of admission, 16.5% of patients were abstinent from alcohol for at least 6 months, and the rest were still drinking.

Instruments

The ASI (Fifth Edition) which was developed by McLellan et al. (4) is a relatively brief, semi-structured interview scale made up

of 140 items. It is a multidimensional instrument assessing six life domains: medical, employment/support, legal, drug and alcohol use, family/social relationships, and psychiatric status (4,17). The distribution of the items over 6 subscales is as follows: 11 items for the Medical Status subscale, 24 items for the Employment/Support Status subscale, 30 items for the Legal Status subscale, 27 items for the Drug/Alcohol Abuse subscale, 26 items for Family/Social Relationships subscale, and 22 items for the Psychiatric Status subscale. These subscales reflect the severity and significance of each problem area as subjectively reported both for lifetime and for the last 30 days. Higher scores signify more need for treatment or counseling (5,18). The ASI provides two types of overall scores for respective problem areas to rate the severity of the problem, including the severity rating and composite score. The severity rating is the subjective rating of severity of both life-time and current problem. The problem severity is rated on a 0 to 9 scale with higher points denoting a higher severity of the problem. The composite score is an objective score which measures problem severity, estimated by summing up the scores after the evaluation of the individual's behaviors within the 30 days prior to the interview. The composite score calculated through a weighted formula designed to provide an equal contribution from each item and rating is between 0 and 1. Here, again higher scores indicate higher severity of the problem. This rating is useful for treatment outcome studies (17,19).

The Beck Depression Inventory (BDI)

This is a self-rating scale determining the level of depression. It consists of 21 items, each of which contains four statements. It was originally developed by Beck (20) and adapted to the Turkish population by Hisli (21). Higher scores in the BDI reflect a higher level of depression.

Table 1. Characteristics of the patients (n=115)

Characteristics	n	%
Marital status		
Single	11	9.6
Married/Remarried	81	70.4
Widowed/Separated/Divorced	23	20.0
Level of Education		
Primary School	24	20.9
Secondary School	26	22.6
High school	42	36.5
University/College	23	20.0
Employment status		
Employed	97	84.4
Unemployed	4	3.5
Retired	14	12.2
Type of Treatment		
Inpatient	27	23.5
Outpatient	88	76.5
Alcohol treatment history		
None	54	47.0
Once before	29	25.2
More than once before	32	27.8

The MacAndrew Alcoholism Scale (MAC)

This scale was first developed by MacAndrew (22), and its validity and reliability studies for the Turkish population were carried out by Ceyhun et al. (23). The MAC is one of the supplemental scales of the Minnesota Multiphasic Personality Inventory (MMPI). It consists of 49 items and is used to discriminate between alcoholic and nonalcoholic patients. High scores should alert clinicians to obtain corroborating data regarding the possibility of substance abuse.

Procedure

Five professionals (3 psychologists and 2 psychiatrists), who knew English language well, and experienced in the field of alcohol and substance use disorders first translated the original form of the ASI-Fifth Edition from English to Turkish. These five translations were compared and similarly translated corresponding items as well as dissimilar ones were evaluated through back-translation. After the back-translations of the corresponding dissimilar items were again translated to Turkish by a translator. Finally the items that represented the original best were selected. Simplicity and credibility of the phrases were also considered during the final evaluation.

When the patients were admitted to treatment, the interview was made. A brief introduction to the interview, in which the interviewer explained the design of the ASI and the use of the patient rating scale, was considered necessary to validate the interview. The ASI was administered by a psychologist (the first author of this study) who was an expert in alcohol and substance use disorders. The psychologist read the ASI manual carefully, and learned the interview methods by herself. The average time required for administration varied between 45 and 60 minutes in one session.

Statistical Analysis

The reliability of the instrument was assessed by measuring the test-retest, interrater and internal reliabilities. The test-retest and interrater reliability were assessed using the Spearman-Brown correlation coefficient. Cronbach's alpha correlation coefficients were calculated to find out the internal consistency. In the validity analysis, correlation coefficients between corresponding severity ratings and composite scores of each subscale and concurrent validity were calculated. Moreover, discriminant validity was assessed by comparing the scores from the ASI with those obtained from the psychological instruments, the BDI and the MAC. An Analysis of Variance (ANOVA) was done for validity study.

Results

Reliability Studies

In the reliability studies, test-retest, the interrater and internal reliabilities were used. Test-retest reliability analysis was done

with a 10-day interval with randomly selected 30 subjects. An initial ASI interview was performed on a subject and then the subject was recontacted 10 days later for a second interview by the same interviewer. During the second interview, the subjects were asked not to try to recall answers from the previous interview, but to focus on the current answers of the questions. Questions asked during the ASI retest were framed to represent the same 30-day period as the initial ASI. Spearman's ρ correlations for each subscale were as follows: .85 for medical status, .79 for employment-support status, .84 for legal status, .85 for alcohol use status, .83 for family-social relations status, and .91 for psychiatric status.

The interrater reliability is the extent of agreement among different judges using the same information (17). Ratings made on randomly selected 33 subjects by two psychologists, who completed doctorate degree, and a psychiatrist, who had several years of psychiatric clinic experience, were compared for interrater reliability analysis. All the interviewers were trained about how to interpret a response. Each interview was videotaped and subsequently viewed by the three judges. The severity ratings on the six problem areas were compared among the judges and across all patients (Table 2).

Besides, internal reliability was found for the responses of 115 patients and Chronbach's alpha correlation coefficients were calculated for 94 items, as the rest of the items were not appropriate to be scored by a continuous numeric value. Chronbach's alpha values showed that acceptable internal consistency for the whole scale was .85, and Chronbach's alpha values for each subscale are shown in Table 3.

Validity Studies

Correlation coefficients between corresponding severity ratings and composite scores of the same problem area were as follows: .89 for medical status, .54 for employment/support status, .87 for legal status, .59 for alcohol use status, .61 for family-social relations status, and .81 for psychiatric status. All severity ratings and composite scores except employment/support status had significantly high correlations ($p < .0001$). The employment/support status failed to demonstrate good correlation coefficient in this sample of patients.

The discriminant validity of psychiatric status was tested using the Turkish version of the BDI and alcohol use was tested using the MAC. The correlation between the total BDI score and the severity rating of psychiatric status subscale was moderate ($r = .45$; $p = .001$). The correlation of the alcohol use score with MAC was .31 ($p = .026$). In addition, DSM-IV diagnosis of alcohol dependence was taken as a "criterion", and alcohol use subscale scores were taken as "predictive scores" and the correlation coefficient between these two was found to be .91 ($p = .0001$).

The concurrent validity analysis for severity scores was done by dividing the sample into three groups based on their

Table 2. Inter-rater Reliability Coefficients (n=33)

Interviewers	Medical	Employment	Legal	Alcohol	Family/Social	Psychiatric
Interviewer 1	.95*	.98*	.75*	.94*	.93*	.94*
Interviewer 2	.99*	.92*	.97*	.90*	.76*	.89*
Interviewer 3	.93*	.93*	.74*	.88*	.71*	.88*

* $p < .0001$

ratings in each of the ASI problem areas: low (0-3), moderate (4-6), and high (7-9) severity scored groups. The judges were asked to identify how much each item would best represent the subscale it belongs. These three groups were then compared on items which were clear indicators of problem status in each area using ANOVA. The results of the comparisons are presented in Table 4. There were differences between the groups in the number of subjects due to differences in the pattern of scale ratings. For example, very few of these subjects had moderate medical problems (n=21). The results of the between group analyses showed .05 and .01 levels of significance (Table 4). These results indicated that the ASI has concurrent validity.

Discussion

This study found that the Turkish version of the ASI has a good reliability, validity and utility in the assessment of male alcohol-dependent patients. Both the test-retest and interrater reliabilities of the Turkish version of the ASI were found high. The three raters made the ratings in this study and these raters had a wide clinical experience with alcohol-dependent patients. In addition, high reliabilities were obtained with a very intensive training of interviewers. In a similar study carried out by Daepfen et al. (10), the interrater reliability analysis was done with 6 raters alcohol-dependent patients in French-speaking Switzerland. They also assessed internal consistency in a similar way to this study and their internal consistency varied from .58 to .81. Similarly, a study focused on drug-dependent patients demonstrated that in the Chinese version of the ASI, test-retest correlation coefficients ranged from .68 to .84, and the interrater correlations ranged from .74 to .98 (13). The results of another study pointed out the high correlation coefficient (5). On the other hand, some of the previous studies reported that legal, drug and family/social scale (12), and employment, legal and family/social scale (24) have low internal consistency. In this study, internal consistency with Cronbach's alpha values was significantly high for the total score, whereas Cronbach's alpha values of the subscales were at

Table 3. Correlation coefficients (n=115)

ASI scales	α
Medical	.74
Employment	.64
Legal	.70
Alcohol	.69
Family/social	.64
Psychiatric	.77

Table 4. Concurrent validity of the ASI

Problem Areas and Items	Low (0-3)	Moderate (4-6)	High (7-9)	F
	n	n	n	
Medical Status				
Days of medical problems	71	21	23	58.70*
Employment/Support				
Usual employment pattern, past 3 years	62	29	24	4.37*
Days paid for working	62	29	24	3.70*
Days experienced employment problems	62	29	24	15.19*
Legal Status				
Serious of present legal problems	113	2	-	19.73*
Alcohol Use				
Years problem drinking	20	14	81	64.25*
Days intoxicated	20	14	81	12.64*
Days experienced alcohol problems	20	14	81	51.07*
Family/Social Relations Status				
Emotionally abuse	41	35	39	19.93*
Days family conflicts	41	35	39	10.46**
Psychiatric Status				
Experienced serious depression	19	40	56	23.90*
Experienced serious anxiety/tension	19	40	56	37.08*
Experienced controlling violent behavior	19	40	56	4.48*
Days of psychiatric problems	19	40	56	18.35*

*p<.05, **p<.01

a statistically acceptable level (.74 and .77). A high correlation was found for only medical status, and psychiatric status (>.70). These results suggest that all of the subscales had satisfying indices of homogeneity and the reliability of both the patient information and the interviewers' ratings of problem severity were at a satisfactory level.

The correlations between composite score of the ASI and each of the severity scores of the subscales were at statistically acceptable levels with the exception of the employment/support status (.54). A high correlation was found between three of the six subscales; medical status, legal status, and psychiatric status. Moreover, the internal consistency for employment/support status was somewhat low (.64). This was a similar result with that of Mc Lellan et al. (17). Scheurich et al. (15) and Haraguchi et al. (8) also reached similar findings. In their studies, each correlation coefficient between the corresponding severity ratings and composite scores ranged from .22 to .93. Applby et al. (25), pointed out the necessity of revising the employment study subscale of the ASI. This conclusion is supported by the findings of the present study as well. There was a limitation of items about retirement in the ASI. Because of a younger standard age of retirement in Turkey, it can be suggested that a patient does not have significant problems at work, although this would not always be the case. For our country, the next step should be to add items related to retirement problems to this subscale.

In this study, the discriminant validity of the ASI was determined for psychiatric status and alcohol use subscales. The results supported that the alcohol-dependent population has a number of psychiatric problems other than their use of alcohol and that these problems are not necessarily related to the severity of their alcohol use. Dixon et al. (26) also found a significant relationship between psychiatric status subscale of the ASI and either substance abuse or mood and anxiety disorders. Similarly, a study focused on homeless substance users demonstrated that the correlation of the alcohol score with the Michigan Alcoholism Screening Test was .31 (27). Specifically, the validity levels of alcohol use and psychiatric status subscales were consistent with the results of the previous studies (15,17). However, further validity studies of the other subscales with consistent psychological instruments would add to the validity of the ASI as a whole. Moreover, this study demonstrated that severity score of the ASI alcohol use was strongly correlated with diagnostic determination. Another study reported that a strong correlation was found between ASI alcohol composite scores and a DSM-IV alcohol dependence diagnosis (28).

In this study, the concurrent validity analysis was done similar to the study of Mc Lellan et al. (17) and a significant relationship was detected between the identified items and the related problem area at the end of ANOVA. It should be pointed out that the relationship of the patient's subjective assessments to the more objective items varies from one area to the next (7).

This study has some limitations. All the patients were male. Therefore, this study can be conducted with female alcohol-dependent patients. Additionally, because the number of drug- and substance-dependent patients was limited, they were not included in the study. Further validation studies of the ASI on drug and substance abusers would also be appropriate. The

discriminant validity of the ASI can be determined using different psychological instruments.

In conclusion, this study suggests that the ASI is a reliable and valid instrument in comprehensive evaluation of biological, social and psychiatric status of patients as well as being an appropriate instrument for giving information and counseling to alcohol-abusing patients besides alcohol dependent ones. In addition, the ASI can be applied to different types of mentally ill patients with concurrent substance abuse problems. Moreover, Hubicka et al. (29) and Haraguchi et al. (8) stated that the ASI profile has some prognostic value for relapse. Therefore, further research might be attempted to compare the types of treatment, to measure treatment outcome and to assess relapse-remission. In addition, the ASI can be renewed after some items added to employment/support status about retired people in Turkish cultural context.

References

1. Arico S, Zannero A, Galatola G, Valenti M, Corrao G. Family compliance to a treatment programme for alcoholics: A prospective study of prognostic factors. *Alcohol Alcohol* 1994; 29:679-685.
2. Litt MD, Babor TF, DelBoca FK, Kadden RM, Cooney NL. Types of alcoholics II. *Arch Gen Psychiatry* 1992; 49:609-614.
3. Isralowitz RE, Peleg A. Israeli college student alcohol use: The association of background characteristics and regular drinking patterns. *Drug Alcohol Depend* 1996; 42:147-153.
4. McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, Pettinatti H, Ageriou M. The fifth edition of the Addiction Severity Index: historical critique and normative data. *J Subst Abuse Treat* 1992; 9:99-213.
5. McLellan AT, Luborsky L, Woody MD, O'Brien C. An improved diagnostic evaluation instrument for substance abuse patients: the Addiction Severity Index. *J Nerv Ment Dis* 1980; 168:26-33.
6. www.catseyesdesign.com. Addiction Severity Index treatment planning manual. 2011.
7. Mäkelä K. Studies of the reliability and validity of the Addiction Severity Index. *Addiction* 2004; 99:398-410.
8. Haraguchi A, Ogai Y, Senoo E, Saito S, Suzuki Y, Yoshino A, Ino A, Yanbe K, Hasegawa M, Murakami M, Murayama M, Ishikawa T, Higuchi S, Ikeda K. Verification of the Addiction Severity Index Japanese Version (ASI-J) as a treatment-customization, prediction, and comparison tool for alcohol-dependent individuals. *Int J Environ Res Public Health* 2009; 6:2205-2225.
9. Tiet QQ, Ilgen MA, Byrnes HF, Harris AHS, Finney JW. Treatment setting and baseline substance use severity interact to predict patients' outcomes. *Addiction* 2007; 102:432-440.
10. Daeppen JB, Burnand B, Schnyder C, Bonjour M, Pécoud A, Yersin B. Validation of the Addiction Severity Index in French-speaking alcoholic patients. *J Stud Alcohol* 1996; 57:585-590.
11. Hendriks VM, Kaplan CD, Van Limbeek J, Geerlings P. The Addiction Severity Index reliability and validity in a Dutch addict population. *J Subst Abuse Treat* 1989; 6:133-141.
12. Krenz S, Dieckmann S, Favrat B, Spagnoli J, Leutwyler J, Schnyder C, Daeppen JB, Besson J. French version of the Addiction Severity Index (5th Edition): Validity and reliability among Swiss opiate-dependent patients. *Eur Addict Res* 2004; 10:173-179.
13. Luo W, Wu Z, Wei X. Reliability and validity of the Chinese version of the Addiction Severity Index. *J Acquir Immune Defic Syndr* 2010; 53:121-125.
14. Senoo E, Ogai Y, Haraguchi A, Kondo A, Ishibashi Y, Umeno M, Kikumoto H, Hori T, Komiyama T, Kato R, Aso K, Asukai N, Wada K, Saitoh S, Ikeda K. Reliability and validity of the Japanese version of the Addiction Severity Index (ASI-J). *Nihon Arukoru Yakubutsu Igakkai Zasshi* 2006; 41:368-379.
15. Scheurich A, Müller MJ, Wetzel H, Anghelescu I, Klawe C, Ruppe A, Lörch B, Himmerich H, Heidenreich M, Schmid G, Hautzinger M, Szegedi A. Reliability and validity of the German version of the European Addiction Severity Index (EuropASI). *J Stud Alcohol* 2000; 61:916-919.

16. Coskunol H. Alcohol use disorders. Celikkol A, editor. Alcohol Use Disorders and Treatment . Izmir: Ege Universitesi Basimevi; 1996; p.141-155.
17. McLellan AT, Luborsky L, Cacciola J, Griffith J, Evans F, Barr HL, O'Brien CP. New data from the Addiction Severity Index. Reliability and validity in three centers. *J Nerv Ment Dis* 1985; 173:412-423.
18. McLellan AT, Hagan TA, Levine M, Gould F, Meyers K, Bencivengo M, Durell J. Supplemental social services improve outcomes in public addiction treatment. *Addiction* 1988; 93:1489-1499.
19. Zanis DA, McLellan AT, Corse S. Is the Addiction Severity Index a reliable and valid assessment instrument among clients with severe and persistent mental illness and substance abuse disorders? *Community Ment Health J* 1997; 33:213-227.
20. Beck AT. An inventory for measuring depression. *Arch Gen Psychiatry* 1961; 4:561-571.
21. Hisli N. Reliability and validity of Beck Depression Inventory in university students. *Psikol Derg* 1989; 23:3-13.
22. MacAndrew C. The differentiation of male alcoholic outpatients from non-alcoholic psychiatric outpatients by means of the MMPI. *Q J Stud Alcohol* 1965; 26:238-246.
23. Ceyhun B, Palabiyikoglu R, Atakurt Y. Clinical application and predictive power of MMPI alcoholism scales in Turkish alcohol population. *J Ankara Medical School* 1990; 12:157-163.
24. Rosen CS, Henson BR, Finney JW, Moos RH. Consistency of self-administered and interview-based Addiction Severity Index composite scores. *Addiction* 2000; 95:419-425.
25. Appleby L, Dyson V, Altman E, Luchins D. Assessing substance use in multiproblem patients: Reliability and validity of the Addiction Severity Index in a mental hospital population. *J Nerv Ment Dis* 1997; 185:159-165.
26. Dixon L, Myers P, Johnson J, Corty E. Screening for mental illness with the Addiction Severity Index. *Am J Addict* 1996; 5:301-307.
27. Zanis DA, McLellan TA, Canaan RA, Randall M. Reliability and validity of the addiction severity index with a homeless sample. *J Subst Abuse Treat* 1994; 11:541-548.
28. Rikoon SH, Caccila JS, Carise D, Alterman AI, McLellan AT. Predicting DSM-IV dependence diagnoses from Addiction Severity Index composite scores. *J Subst Abuse Treat* 2006; 31:17-24.
29. Hubicka B, Laurell H, Bergman H. Psychosocial characteristics of drunk drivers assessed by the Addiction Severity Index, prediction of relapse. *Scand J Public Health* 2010; 38:71-77.