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ORIGINAL ARTICLE

# The Alcohol Use Disorders Identification Test (AUDIT): Reliability and Validity of the Persian Version

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## Abstract

*Background:* Alcohol Use Disorders (AUDs) has been recently prioritized as a health problem in Iran. The Alcohol Use Disorders Identification Test (AUDIT) is an easy-to-use diagnostic tool for excessive drinking. This study was designed to assess the validity and reliability of the Persian version of AUDIT questionnaire.
*Methods:* Participants were 70 individuals with AUD (study group) and 70 non-alcoholic individuals (control group). Persian AUDIT was completed for all participants. Explanatory factor analysis was used for construct validity; and the reliability of AUDIT was determined by examining internal consistency and test-retest reliability. ROC curve was applied for calculation of specificity and sensitivity.
*Results:* Using Cronbach's alpha, the internal reliability of the Persian AUDIT was estimated to be 0.77. The internal consistency coefficient of the Persian AUDIT was calculated to be 0.78 by the split-half method in the total population. The correlation of the test-retest results was statistically significant ($r = 0.711$, $P = 0.020$). Using the ROC curve at the cutoff point of 8, a specificity and sensitivity of 89% and 99% was achieved for the test and the accuracy of the area under the curve was achieved to be 99% ($P < 0.001$). The cutoff value of 8 in AUDIT questionnaire was specified as the best cutoff point. Control subjects obtained significantly lower mean scores compared to alcoholic subjects ($P < 0.001$).
*Conclusion:* Given the acceptable reliability and validity of the Persian AUDIT and its high sensitivity and specificity, it can be used as an effective instrument for identification of AUDs, risky drinkers and early detection of ulterior cases of alcohol addiction in the Persian speaking population.

**Keywords:** Alcohol-Related Disorders; Alcoholism; Iran; Questionnaires; Reproducibility of Results

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## INTRODUCTION

The World Health Organization (WHO) has estimated that more than two billion people worldwide consume alcoholic beverages on a daily basis (1). Alcohol-related problems are a global concern resulting in 3.3 million deaths each year (2). The extent of alcohol consumption and alcohol-related disorders vary in different regions of the world; however, the disease burden and the related mortality is a major health issue in most countries (1,2).

In Iran, there has been no national survey on alcohol use disorders (AUDs); nonetheless, a number of case studies focusing on the prevalence of alcohol consumption in different settings and limited target population are available. According to these studies over 2000 people per 100,000 population in Iran have consumed alcohol for at least once in the past year (3,4). Due to the religious beliefs and the legal ban against alcohol consumption in Iran, regular alcohol drinking has been predicted to be low (2); however, based on a recent study conducted by the Iranian Ministry of Health, alcohol consumption has shown an increasing trend which led to the conclusion that alcohol use prevention policies should be considered as a health priority in the future health planning (5).

Excessive alcohol drinking in the forms of high-level drinking per day, repeated episodes of drinking to intoxication and alcohol dependence can cause substantial risk or harm to the individual or their family. It is one of the major causes of familial disharmonies, trauma, chronic illnesses, prolonged disability and early death (2). Hence, early detection of this condition is of great value. The Alcohol Use Disorders Identification Test (AUDIT) questionnaire developed by the WHO is a specific easy-to-use diagnostic tool for excessive drinking which can also help in brief assessment. It also provides a framework for AUD intervention to help heavy drinkers reduce or stop drinking (6-8). The first version of AUDIT was designed in 1989 which was then updated in 1992 (6,7). Its validity and reliability have been confirmed in many studies (9,10), and the same was also observed for the

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translated versions into other languages (11-14). Studies have suggested applicability of translating AUDIT to different languages for use in primary care and inpatient settings in different countries. No clinically applicable and valid Persian version of AUDIT has been introduced until recently when we decided to develop a convenient Persian version. This study was designed to evaluate the validity and reliability of this newly developed Persian version of AUDIT.

## METHODS

AUDIT is consisted of 10 questions, which the first 3 question the amount and frequency of alcohol drinking, the next 3 address alcohol dependence and the last 4 probe the behavioral and psychiatric problems caused by alcohol consumption. Response to each question can be scored from 0 to 4. A final score of ≥12 is referred to as a drinking problem while a score ≥15 suggests an AUD. Eventually, a score ≥26 indicates alcohol dependence (7,10).

In order to prepare the Persian version of AUDIT, the original version of AUDIT questionnaire was translated into Persian by two physicians who had good English knowledge and were well-experienced in the field of addiction management. Subsequently, the Persian translation was given to another two physicians and was back-translated into English. Certain comparisons focusing on linguistic reform were made. In the next step, the revised Persian version was sent to a number of experts in the field of addiction and the overall consensus over the content of questionnaire was achieved on the draft version in a separate meeting. The finalized version was then provided to the research team for further application and completion (pls. see the appendix).

### *Participants, data collection and ethics*

Target population included all individuals with AUDs who had recently joined the Alcoholics Anonymous (AA) and were diagnosed as having AUD according to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) criteria (15). From these newcomers to AA, 70 individuals (50 men and 20 women) were selected by convenient method. The questionnaire was completed for each participant at the time of study entrance (during February to August 2014) by a well-experienced team of interviewers before performing any type of medical, social or psychological intervention. Demographic data including age, sex, educational and marital status were also recorded.

The control group included 70 healthy individuals (50 men and 20 women) who did not fulfill the DSM-5 criteria for AUD and had no other medical or psychological problem and no history of alcohol drinking. They were selected from the staff members or the visitors to the public healthcare centers in Mashhad after giving informed consent. Both groups were matched for age, sex and marital status. The participants were reassured that the confidentiality of their personal data will be maintained. The study protocol was approved by the local ethics committee of Mashhad University of Medical Sciences (Code: 921091- 08 Feb 2014).

### *Data analyses*

Explanatory factor analysis was done for construct validity of the questionnaire. The reliability of the questionnaire was determined by evaluating internal consistency and test-retest reliability. ROC curve was applied for calculation of specificity and sensitivity. Independent samples t-test was used for comparisons between the two groups. Data analyses were done by SPSS version 20 (SPSS Inc., Chicago, USA). A p-value less than 0.05 was considered as statistically significant.

## RESULTS

The mean age of the participants in study and control group was 32.7 ± 9.1 and 30.1 ± 7.2 years respectively which showed no significant difference (P = 0.084). In study group, 46 persons (65.5%) and in control group 41 persons (58.6%) were married respectively (P = 0.384), which were not also significantly different from each other.

Using the Cronbach's alpha, the internal reliability of the Persian AUDIT was estimated to be 0.77 showing that 23% of the questionnaire's total score variance was due to measurement errors. This value was 0.77 for the study group and 0.76 for the control group. By omitting the second question the value increased but the increase was minor. In addition, the internal consistency coefficient of the Persian AUDIT was calculated to be 0.78 by the split-half method in the total population. The correlation coefficient of each question with the total AUDIT score and the Cronbach's alpha value in case of omitting an item in the two groups is shown in Table1.

The correlation of the test-retest results was statistically significant (r = 0.711, P = 0.020). Using the ROC curve at the cutoff point of 8, a specificity and sensitivity of 89% and 99% was achieved for the test and the accuracy of the area under the curve was achieved to be 99% (P < 0.001).

Exploratory factor analyses were used to determine the questionnaire categories or factors (amount of consumption, dependence, problem-causing questions categories). To assess the adequacy of the population size and the sampling adequacy for exploratory factor analyses, the Kaiser–Meyer–Olkin test (KMO) was used. The KMO index was achieved to be 0.82 which was identified as a very good sample size adequacy for performing exploratory factor analyses. Moreover, the Chi square calculated for the Bartlett's test of sphericity was 470.56 (P < 0.001) which means the null hypothesis is rejected and concludes that there are certain correlations in the dataset which are appropriate for factor analysis. The varimax rotation method was also used and questions with a factor load above 0.3 were selected. The correlation of each question with the factor was not less than 0.3 and the eigenvalues of the factors 1 to 3 were all above 1, which are of statistical significance.

The explained eigenvalues and variances by each of the three categories of the questionnaire in the study population and item loading for the three categories extracted from varimax rotation are shown in Table 2 and 3. The first, second and third categories which refers to the amount of alcohol drinking, dependence and problem-causing included29.35%, 29.20% and 17.60% of the variance; altogether contributing to 76.2% of the variance underlining the most important factors which have the greatest role in explaining the variance of data.

Moreover, the cutoff value of 8 in AUDIT questionnaire was specified as the best cutoff point.

**Table 1.** The correlation coefficient of each question with the total AUDIT score and the Cronbach's alpha value in case of omitting an item in the study and control groups

| | AUDIT questions (Original version) | Study group* | | Control group** | |
|---|---|---|---|---|---|
| | | Correlation of question with questionnaire | Cronbach's α after omitting question | Correlation of question with questionnaire | Cronbach's α after omitting question |
| Amount of alcohol drinking | Q1: How often do you have a drink containing alcohol? | 0.729 | 0.788 | 0.817 | 0.781 |
| | Q2: How many units of alcohol do you drink on a typical day when you are drinking? | 0.724 | 0.786 | 0.701 | 0.886 |
| | Q3: How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year? | 0.791 | 0.798 | 0.754 | 0.861 |
| Alcohol dependence | Q4: How often during the last year have you found that you were not able to stop drinking once you had started? | 0.778 | 0.819 | 0.804 | 0.813 |
| | Q5: How often during the last year have you failed to do what was normally expected from you because of drinking? | 0.779 | 0.823 | 0.752 | 0.801 |
| | Q6: How often during the last year have you needed an alcoholic drink in the morning to get yourself going after a heavy drinking session? | 0.759 | 0.812 | 0.721 | 0.843 |
| Problem causing | Q7: How often during the last year have you had a feeling of guilt or remorse after drinking? | 0.801 | 0.808 | 0.821 | 0.764 |
| | Q8: How often during the last year have you been unable to remember what happened the night before because you had been drinking? | 0.746 | 0.810 | 0.703 | 0.881 |
| | Q9: Have you or someone else been injured as a result of your drinking? | 0.731 | 0.782 | 0.741 | 0.776 |
| | Q10: Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down? | 0.729 | 0.751 | 0.701 | 0.891 |

* Alcoholic participants

** Non-alcoholic participants

**Table 2.** The explained eigenvalues and variances by each of the three factors of the questionnaire in the study group

| Factors | Specific value | Percentage of explained variance | Cumulative percentage variance |
|---|---|---|---|
| 1 | 2.93 | 29.30 | 29.35 |
| 2 | 2.92 | 29.25 | 58.61 |
| 3 | 1.76 | 17.64 | 76.24 |

**Table 3.** Item loading for the three categories extracted from varimax rotation

| Questions | Categories | | |
|---|---|---|---|
| | I | II | III |
| 1 | 0.733 | | 0.437 |
| 2 | -0.670 | 0.634 | |
| 3 | | 0.560 | 0.590 |
| 4 | | 0.203 | 0.806 |
| 5 | | 0.839 | |
| 6 | | 0.833 | |
| 7 | 0.522 | 0.722 | 0.519 |
| 8 | | 0.819 | |
| 9 | 0.895 | | |
| 10 | 0.921 | | |

Control subjects obtained significantly lower mean scores in the consumption, dependence, problem-causing question categories as well as total scores compared to alcoholic subjects (Table 4).

Table 5 shows comparison of the consumption, dependence, problem-causing and total AUDIT scores between the two genders of the alcoholic participants (study group). There were no significant differences between genders according to consumption, dependence and total scores, while men gained significantly higher scores in the category of problem-causing questions.

## DISCUSSION

To the best of our knowledge, this was the first attempt to develop and to determine the validity and reliability of the Persian version of AUDIT questionnaire. So far, the validity and reliability of other translated versions of AUDIT such as Korean, Greek, Japanese, Nepali and French versions have been confirmed (11-14,16). This study showed that the Persian AUDIT is a practical tool in studying AUDs with a high level of internal consistency, reliability and validity.

**Table 4.** Comparison of the consumption, dependence, problem-causing and total AUDIT scores between the study and control groups

| | Group | Mean ± SD | P value |
|---|---|---|---|
| Consumption score | Study* | 5.94 ± 1.79 | < 0.001 |
| | Control** | 0.68 ± 1.61 | |
| Dependence score | Study | 9.61 ± 2.74 | < 0.001 |
| | Control | 0.91 ± 2.12 | |
| Problem-causing score | Study | 8.61 ± 2.36 | < 0.001 |
| | Control | 0.40 ± 1.08 | |
| Total score | Study | 24.15 ± 5.44 | < 0.001 |
| | Control | 1.98 ± 4.54 | |

* Alcoholic participants
** Non-alcoholic participants

**Table 5.** Comparison of the consumption, dependence, problem-causing and total AUDIT scores between the two genders of the alcoholic participants (study group)

| | Gender | N | Mean ± SD | P value |
|---|---|---|---|---|
| Consumption score | Male | 50 | 5.78 ± 1.81 | 0.232 |
| | Female | 20 | 6.35 ± 1.72 | |
| Dependence score | Male | 50 | 9.26 ± 2.83 | 0.113 |
| | Female | 20 | 10.45 ± 2.35 | |
| Problem-causing score | Male | 50 | 9.16 ± 1.46 | 0.024 |
| | Female | 20 | 7.21 ± 3.44 | |
| Total score | Male | 50 | 24.21 ± 5.07 | 0.921 |
| | Female | 20 | 24.05 ± 6.44 | |

The majority of patients with AUDs seek medical care due to physical and mental problems (17). As AUDIT is an easy to use and reliable tool, it can be of considerable benefit in this respect, especially in at-risk communities and for alcoholics with mental problems (18). AUDIT can be applied as part of the strategies focused on alcohol use prevention, early detection, treatment, achieving better outcome and also for differential diagnoses of sign and symptoms suggestive of AUDs.

Through appropriate screening by physicians, brief interventions can be performed for patients at risk of AUDs to reduce alcohol consumption (17,19). In this respect, the availability of a simple screening test such as AUDIT in emergency services or busy healthcare settings would be greatly useful. The Persian AUDIT can be used in primary health care settings and emergency services to promote countermeasures for reducing alcohol-related disease burden and social problems in Iran.

## CONCLUSION

Given the acceptable reliability and validity of the Persian AUDIT and its high sensitivity and specificity, it can be used as an effective instrument for identification of AUDs, risky drinkers and early detection of ulterior cases of alcohol addiction in the Persian speaking population.

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**Appendix.** Persian AUDIT

**آزمون تشخیص اختلالات مصرف الکل (AUDIT)؛** لطفا دور گزینه‌ای که وضعیت شما را به نحو بهتری توصیف می‌کند، دایره بکشید:

| | | | | |
|---|---|---|---|---|
| ۱. هر چند وقت یک‌بار از نوشیدنی‌های الکلی استفاده می‌کنید؟ | | | | |
| هرگز (۰) | ماهی یک‌بار یا کمتر (۱) | دو یا سه بار در ماه (۲) | دو یا سه بار در هفته (۳) | چهار بار یا بیشتر در هفته (۴) |
| ۲. در یک روز معمول چند واحد نوشیدنی الکلی مصرف می‌کنید؟ | | | | |
| ۱یا ۲ (۰) | ۳ یا ۴ (۱) | ۵ یا ۶ (۲) | ۷ تا ۹ (۳) | ۱۰ تا بیشتر (۴) |
| ۳. هر چند وقت یک‌بار در یک موقعیت، ۶ واحد نوشیدنی الکلی یا بیشتر می‌نوشید؟ | | | | |
| هرگز (۰) | کمتر از ماهی یک‌بار (۱) | ماهی یک‌بار (۲) | هفته‌ای یک‌بار (۳) | هر روز یا تقریباً روزی یک‌بار (۴) |
| ۴. چند بار در طی سال گذشته متوجه شدید که قادر نیستید وقتی شروع به مصرف نوشیدنی‌های الکلی می‌کنید، آن را متوقف کنید؟ | | | | |
| هرگز (۰) | کمتر از ماهی یک‌بار (۱) | ماهی یک‌بار (۲) | هفته‌ای یک‌بار (۳) | هر روز یا تقریباً روزی یک‌بار (۴) |
| ۵. چند بار در طی سال گذشته به خاطر مصرف نوشیدنی‌های الکلی از انجام کاری که از شما انتظار می‌رفته است، باز ماندید؟ | | | | |
| هرگز (۰) | کمتر از ماهی یک‌بار (۱) | ماهی یک‌بار (۲) | هفته‌ای یک‌بار (۳) | هر روز یا تقریباً روزی یک‌بار (۴) |
| ۶. چندبار در طی سال گذشته برای اینکه بتوانید بعد از یک نوبت نوشیدن سنگین خودتان را بسازید، نیاز به مصرف نوشیدنی الکلی در صبح پیدا کردید؟ | | | | |
| هرگز (۰) | کمتر از ماهی یک‌بار (۱) | ماهی یک‌بار (۲) | هفته‌ای یک‌بار (۳) | هر روز یا تقریباً روزی یک‌بار (۴) |
| ۷. چند بار در طی سال گذشته بعد از نوشیدن الکل احساس گناه یا پشیمانی داشتید؟ | | | | |
| هرگز (۰) | کمتر از ماهی یک‌بار (۱) | ماهی یک‌بار (۲) | هفته‌ای یک‌بار (۳) | هر روز یا تقریباً روزی یک‌بار (۴) |
| ۸. چند بار در طی سال گذشته به سبب نوشیدن الکل نتوانستید به یاد بیاورید که شب گذشته چه اتفاقی افتاده است؟ | | | | |
| هرگز (۰) | کمتر از ماهی یک‌بار (۱) | ماهی یک‌بار (۲) | هفته‌ای یک‌بار (۳) | هر روز یا تقریباً روزی یک‌بار (۴) |
| ۹. آیا تاکنون به واسطه‌ی مصرف نوشیدنی‌های الکلی، به خودتان یا شخص دیگری صدمه رسانده‌اید؟ | | | | |
| نه (۰) | | بله، ولی نه در سال گذشته (۲) | | بله، در طی سال گذشته (۴) |
| ۱۰. آیا تاکنون دوست، فردی از خانواده، پزشک یا کارمند بهداشت در مورد مصرف الکل شما اظهار نگرانی کرده یا اینکه به شما پیشنهاد داده است آن را متوقف کنید؟ | | | | |
| نه (۰) | | بله، ولی نه در سال گذشته (۲) | | بله، در طی سال گذشته (۴) |