ASHDIN
publishing

Research Article

Psychometric Properties of an Arabic Version of the Alcohol Use Disorder Identification Test (AUDIT) scale among Lebanese Adults

Reine Azzi[1], Pascale Salameh[2,3,4,5], Hala Sacre[3], Sahar Obeid[6#], Souheil Hallit[1,7,8*]

[1]*School of Medicine and Medical Sciences, Holy Spirit University of Kaslik, P.O. Box 446, Jounieh, Lebanon*
[2]*School of Medicine, Lebanese American University, Lebanon*
[3]*National Institute of Public Health, Clinical Epidemiology and Toxicology (INSPECT-LB), Lebanon*
[4]*Department of Primary Care and Population Health, University of Nicosia Medical School, Cyprus*
[5]*Faculty of Pharmacy, Lebanese University, Lebanon*
[6]*School of Arts and Sciences, Social and Education Sciences Department, Lebanese American University, Jbeil, Lebanon*
[7]*Applied Science Research Center, Applied Science Private University, Amman, Jordan*

[*]*Address Correspondence to Souheil Hallit, E-mail: souheilhallit@hotmail.com*

Note: Souheil Hallit and Sahar Obeid contributed equally to this work, so they chose to have joint Corresponding authorship.

Abstract

Objectives: To validate the Arabic versions of the Alcohol Use Disorders Identification Test (AUDIT) scale among a sample of Lebanese adults.

Methods: A random sample of 789 community participants was enrolled between November 2017 and March 2018. The exploratory-to-confirmatory factor analyses strategy was followed. The Root Mean Square Error of Approximation (RMSEA) statistic, the Tucker Lewis Index (TLI), and the Comparative Fit Index (CFI) were used to evaluate the goodness-of-fit of the model as these are the most commonly used indices.

Results: The AUDIT scale items converged on one factor following an exploratory factor analysis (variance explained=58.13%; McDonald's ω=.88). The CFA indicated that fit of the one-factor model of the AUDIT was acceptable: $\chi^2/df=138.36/35=3.95$, RMSEA=.087 (90% CI .072, .103), SRMR=.047, CFI=.943, TLI =.926 (ω=.89). Higher AUDIT scores were significantly and positively associated with alexithymia, depression, anxiety and suicidal ideation.

Conclusion: The psychometric properties of the AUDIT scale are excellent and suggest that this scale can be used by clinicians to screen for problematic alcohol use among Lebanese adults.

Keywords: Problematic alcohol use; AUDIT scale; Concurrent validity; Arabic; validation; Psychometric properties

List of Abbreviations

(AUDIT) Alcohol Use Disorder Identification Test; (RMSEA) Root Mean Square Error of Approximation; (TLI) Tucker Lewis Index; (CFI) Comparative Fit Index; (WHO) World Health Organization; (PAU) Problematic Alcohol Use; (DSM–5) Diagnostic and Statistical Manual of Mental Disorders-5th edition; (TAS) Toronto Alexithymia Scale; (HAM-D) Hamilton Depression Rating Scale; (HAM-A) Hamilton Anxiety Rating Scale; (CSSRS) Columbia-Suicide Severity Rating Scale; (KMO) Kaiser-Meyer-Olkin; (CFA) Confirmatory Factor Analysis; (WRMR) Weighted Root Mean Square Residual; (PA) Parallel Analysis; (CFI) Comparative Fit Index

Background

Alcohol plays a big part in today's society as more men and women consume it in social contexts and as part of a socialization process [1]. Alcohol or ethanol is an intoxicating agent in spirited beverages that can cause substance dependency and is psychotropic, making the growing consumption of these beverages a health hazard. As stated by the World Health Organization (WHO), alcohol use is responsible for about 3 million deaths globally every year and is accountable for 5.1% of the global burden of disease [2]. Furthermore, with a growing rate of alcohol consumption comes an increase in alcohol misuse and alcohol dependence disorders, as alcohol misuse is a spectrum of behaviors that include excessive and risky alcohol use and alcohol dependence. According

to the World Health Report in 2018, Problematic Alcohol Use (PAU) has come to be the leading risk factor for health problems in developing countries (World Health Organization., 2019). It is responsible for 2.2% and 7.1% of the global disease burden in women and men, respectively [2]. It has also become the principal factor for premature disability and mortality among individuals aged between 15 and 49 [2].

The Alcohol Use Disorders Identification Test (AUDIT) is the only alcohol screening test distinctively devised for international use [3]. This scale is extensively used across countries to assess alcohol consumption patterns and hazardous drinking [4]. The AUDIT scale has been validated in many languages, but it has yet to be validated in Arabic to be used as an assessment tool in Arab-speaking countries. The WHO aimed to construct a scale with international applicability to screen for alcohol disorders, explaining why the AUDIT scale has been increasingly used to screen non-English speakers [5]. Hence, this scale has been validated in many languages, including French, Spanish, Portuguese, Swedish, Chinese, and many more [6-10]. It was also validated in Arabic in a sample of prisoners in the United Arab Emirates, university students in Lebanon, and Lebanese adolescents, but never in the general adult population [4,11,12]. Although university students and prisoners are adults, they are far from being representative of the Lebanese general population. Boating, et al. (2018) suggests that potential scale items be tested on a heterogeneous sample, which reflects and captures the range of the target population [13]. Arabic is a language used in 25 countries, making it primordial to validate the AUDIT scale in this language to be in accordance with the WHO's goal of having a screening tool with international applicability.

Lebanese people are more prone to mental diseases for multiple reasons; in 2003, approximately 50% of the people in Lebanon were traumatized as a consequence of the war [14]. In addition, a history filled with terrorist attacks and wars, an unstable political situation, and a lack of a clean environment contributed to an increase in mental disorders among the Lebanese population [15]. Another contributing factor was the growing number of Syrian refugees, leading to decreased employment rates for Lebanese people and Xenophobia among the Lebanese [16,17]. These factors are consistent with the societal perspective of Lebanese towards mental conditions as shameful and the stigma and unspoken prohibition of seeking help from healthcare professionals for mental illnesses [18]. A previous Lebanese study showed an association between mental health issues and alcohol use disorder; Problematic Alcohol Use (PAU) is a major public health concern in Lebanon, a country with no regulations to control the purchase and use of alcohol, increased rates of alcohol-attributable deaths, and an increased prevalence of alcohol use disorder and dependence [19,20]. According to the Ministry of Public Health in Lebanon, mental health problems have been a growing public health issue [21]. A recent study conducted in Lebanon showed that mental health disturbances and illnesses were associated with a higher risk of alcohol use disorder and higher depression and suicidal ideation [19]. Thus, this study aims to validate the AUDIT scale in Arabic among a sample of Lebanese adults. It is hypothesized that the AUDIT scale would have a good factorial validity (H1) and a good internal consistency (H2). Since alcohol use disorder is classified as a mental health issue according to the Diagnostic and Statistical Manual of Mental Disorders-5th edition (DSM–5), it is expected that AUDIT scores be positively related to depression, anxiety, and suicidal ideation (H3) [22].

Methods

Study design and sampling

A random sample of 789 participants residing in Lebanon was enrolled in this study conducted between November 2017 and March 2018 in all Lebanese regions/governorates. Each governorate is partitioned into Caza/districts, which, in turn, are split into villages. The list of communities (or villages) was available for every caza; 2 communities were randomly selected for every caza, and the local authority was approached to have the list of dwellers per community from which participants were chosen. All adults (older than 18 years old) living in the house were eligible to partake in the study. Individuals who declined to fill out the questionnaire and those who had dementia or intellectual disability as disclosed by a family member were excluded. The data collection was carried out by trained students through personal interviews with the partakers. To guarantee the quality of research and refrain from interrater variability, as much as is achievable, the students underwent training ahead of launching data collection. The same methodology was used in previous papers from the same project [23-29].

Measures

The questionnaire used was in Arabic. It included the sociodemographic characteristics of participants (age, gender, education level, marital status, socioeconomic level) and the following scales:

Alcohol Use Disorders Identification Test (AUDIT): Validated among adolescents 4, this self-reported 10-item scale was used to assess 3 different aspects of alcohol use 3: Quantity and frequency (3 items), alcohol dependence (3 items), and problems caused by alcohol misuse (4 items). The total score ranged between 0 and 40, with PAU considered when participants scored 8 or more. The Arabic version of the items can be found in Appendix 1.

Other validated scales: The validated Arabic versions of the Toronto Alexithymia Scale (TAS), Hamilton depression rating scale (HAM-D), Hamilton anxiety rating scale (HAM-A), and Columbia-suicide Severity Rating Scale (CSSRS) were utilized in this research, with higher scores reflecting higher depression, anxiety, and suicidal ideation, respectively [30-34]. These variables were chosen to assess concurrent validity of the AUDIT scale since they were shown to be previously positively correlated with each other [19].

Statistical analysis

Data analysis was done using the SPSS software v.23. Missing values were replaced with the mean value 35. Calculation of the skewness and kurtosis confirmed the normality of distribution of the AUDIT score; values for asymmetry and kurtosis between -1 and +1 are envisaged as satisfactory to demonstrate normal univariate distribution in addition to a sample >300 persons [36,37]. The Chi-square test was used to compare 2 categories, whereas the Student t test was used to compare 2 means. Pearson test was used to correlate 2 continuous variables. A p-value below 0.05 was envisaged as significant.

To examine the factor structure of the AUDIT, we used an EFA-to-CFA strategy [38]. We used the randomization option in SPSS to divide the sample into 2 subgroups used for the EFA and CFA respectively. No significant differences was recorded between the 2 subsamples in terms of mean age, t(765)=.392, p=.129, gender, $\chi 2$(1)=.009, p=.923, marital status, $\chi 2$(1)=1.568, p=.211, and education level $\chi 2$(1)=3.660, p=.056.

To explore the factor structure of AUDIT, we computed a principal-component EFA with the first split-half subsample using the FACTOR software [39]. A minimum sample of 200 participants was required to validate the AUDIT scale based on 20 participants per 1 scale item [40]. We verified all requirements related to item-communality, average item correlations, and item-total correlations [41]. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (which should ideally be ≥ .80) and Bartlett's test of sphericity (which should be significant) ensured the adequacy of our sample [42]. The procedure followed for determining the number of dimensions was the Parallel Analysis (PA), using the polychoric correlation matrix [43]. Weighted Root Mean Square Residual (WRMR) were also calculated to assess the model fit (values <1 have been recommended to represent good fit [44]). Item retention was based on the recommendation of a factor loading >0.4 and with low inter-item correlations (suggestive of low item redundancy) as indicated by the anti-image correlation matrix should be retained [45].

A Confirmatory Factor Analysis (CFA), using the maximum likelihood estimation methods, was performed using SPSS AMOS v.29 based on the factor solution obtained in the EFA. The Root Mean Square Error of Approximation (RMSEA) statistic, the Tucker Lewis Index (TLI), and the Comparative Fit Index (CFI) assessed the goodness-of-fit of the model as these are the most common indices [46]. Values of RMSEA ≤ 0.08, and CFI and TLI ≥ 0.90 stipulate a good-fitting model [46]. A previous study suggested that the minimum sample size to conduct a confirmatory factor analysis ranges from 3 times to 20 times the number of the scale's variables [40]. Therefore, we assumed a minimum sample of 200 participants needed to have enough statistical power based on a ratio of 20 participants per one item of the scale, which was exceeded in this subsample.

To examine gender invariance of AUDIT scores, we conducted multi-group CFA using the second split-half sample [47]. Measurement invariance was assessed at the configural, metric, and scalar levels [48]. Gender invariance was achieved if ΔCFI ≤ .010 and ΔRMSEA ≤ .015 or ΔSRMR ≤ .010 48. The AUDIT scores were compared between genders using the Student t-test if scalar or partial scalar invariance were verified.

Composite reliability in both subsamples was assessed using McDonald's ω and Cronbach's α, with values greater than .70 reflecting adequate composite reliability [49]. The same analysis plan was followed in a previous paper [50].

Results

McDonald's omega values in the total sample were as follows: TAS (ω=.94), HAM-D (ω=.89), HAM-A (ω=.90) and CSSRS (ω=.80).

Sociodemographic and other characteristics of the participants

The mean age of the participants was 30.35 years, with 54.8% males. The results showed that the mean AUDIT score was 10.24 ± 8.29, with 390 (49.6%) participants having PAU [95% CI 0.461-0.531]. Other characteristics are summarized in Table 1.

Table 1: Sociodemographic and other characteristics of the participants (N=789)

Variable	N (%)
Gender	-
Male	423 (54.8%)
Female	349 (45.2%)
Marital status	-
Single	537 (69.5%)
Married	236 (30.5%)
Education categories	-
Primary/complementary	103 (13.9%)
Secondary	113 (15.2%)
University	526 (70.9%)
Monthly income	-
Low (<1000 USD)	376 (50.7%)
Intermediate (1000-2000 USD)	260 (35.1%)
High (>2000 USD)	105 (14.2%)
-	Mean ± SD
Age (in years)	30.35 ± 12.47

Exploratory factor analysis (subsample 1)

Bartlett's test of sphericity, $\chi 2$ (45)=2570, p<.001, and KMO (.918) again indicated that the AUDIT items had adequate common variance for factor analysis. The advised number of dimensions according to the parallel analysis was one, which was verified in our analysis (variance explained=58.13%). The WRMR value was also adequate (=.073; 95% CI .061-.079), indicating good fit of the model. Internal reliability was adequate (ω=.88; α=.89). The factor loadings are reported in Table 2.

Table 2: Items of the AUDIT in english and factor loadings derived from the Exploratory Factor Analyses (EFA) in the first split-half subsample, and standardized estimates of factor loadings from the Confirmatory Factor Analysis (CFA) in the second split-half subsample

Item	Factor loading 1-factor model		Factor loading 2-factor model	Factor loading 3-factor model
	EFA	CFA	CFA	CFA
1. How often do you have a drink containing alcohol?	0.45	0.4	0.44	0.51
2. How many standard drinks containing alcohol do you have on a typical day when drinking?	0.61	0.6	0.56	0.6
3. How often do you have six or more drinks on one occasion?	0.78	0.7	0.73	0.86
4. During the past year, how often have you found that you were not able to stop drinking once you had started?	0.81	0.8	0.82	0.82
5. During the past year, how often have you failed to do what was normally expected of you because of drinking?	0.88	0.8	0.82	0.82
6. During the past year, how often have you needed a drink in the morning to get yourself going after a heavy drinking session?	0.86	0.8	0.82	0.82
7. During the past year, how often have you had a feeling of guilt or remorse after drinking?	0.73	0.6	0.62	0.65
8. During the past year, have you been unable to remember what happened the night before because you had been drinking?	0.84	0.8	0.8	0.82
9. Have you or someone else been injured as a result of your drinking?	0.79	0.6	0.56	0.57
10. Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?	0.77	0.6	0.56	0.58

Confirmatory factor analysis based on the EFA results (subsample 2)

CFA indicated that fit of the one-factor model of the AUDIT was acceptable: $\chi^2/df=138.36/35=3.95$, RMSEA=.087 (90% CI .072, .103), SRMR=.047, CFI=.943, TLI=.926. Internal reliability was adequate (ω=.89; α=.87). The standardized estimates of factor loadings were all adequate (Table 2).

Confirmatory factor analysis of the two and three-factor models (subsample 2)

The fit indices obtained from the CFA of the two-factor model of the AUDIT were: $\chi^2/df= 138.19/34=4.07$, RMSEA=.089 (90% CI .074, .105), SRMR=.047, CFI=.942, TLI=.923. Those of the 3 factor model were as follows: $\chi^2/df=91.53/32=2.86$, RMSEA=.069 (90% CI .053, .086), SRMR=.040, CFI=.967, TLI=.954.

Gender invariance (subsample 2)

The indices shown in Table 3 suggested that configural, metric, and scalar invariance was supported across gender. Males had a higher mean AUDIT score (M=13.19, SD=8.83) compared to females (M=8.65, SD=7.69) in the second subsample, t(376)=5.278, p<.001, d=.548.

Table 3: Measurement invariance across gender in the second split-half sample

Model	χ^2	df	CFI	RMSEA	SRMR	Model comparison	$\Delta\chi^2$	ΔCFI	ΔRMSEA	ΔSRMR	Δdf	p
Configural	184.55	70	0.932	0.066	0.05	-	-	-	-	-	-	-
Metric	195.54	79	0.931	0.063	0.055	Configural vs metric	10.99	0.001	0.003	0.005	9	0.276
Scalar	248.84	89	0.905	0.069	0.06	Metric vs scalar	53.3	0.026	0.006	0.005	10	<.001

Note: CFI=Comparative Fit Index; RMSEA=Steiger-Lind Root Mean Square Error of Approximation; SRMR=Standardised Root Mean Square Residual

Concurrent validity (subsample 2)

More problematic alcohol use was significantly associated with alexithymia (r=.31; p<.001), depression (r=.49; p<.001), anxiety (r=.36; p<.001) and suicidal ideation (r=.41; p<.001).

Discussion

Factor validity-hypothesis 1

Our findings, in terms of EFA and CFA, supported the one-factor solution representing all aspects of the negative consequences of alcohol drinking patterns and use. The fit indices of the two-factor model were acceptable but not optimal, whereas the fit indices of the three-factor model were adequate. Multiple models were suggested for this scale (one, two and three-factor models). The conventional one-factor design implies a unidimensional model, as pointed out by Gmel, et al. (2001); however, the two-factor model shows that negative consequences of alcohol use and patterns of drinking, although related, are 2 distinct dimensions [51-54]. Other researchers claimed that the one-factor model yielded more correlated error variance among scale items, which led it to be revised multiple times to generate a proper one-factor model, making it inferior to the two-factors model [55]. Other studies found that the two-factor model was more fit to the data than the one-factor model; although the three-factors model was more fit than the one-factor model, it was inferior to the two-factors model and fit the data less [56,57]. Moreover, measurement invariance was demonstrated for the AUDIT scale across

genders in this study, showing that it can be used among males and females for the assessment of problematic alcohol use.

Internal consistency-hypothesis 2

The Arabic version of the AUDIT scale showed a McDonald's omega value of .88 and .89, which indicates high internal consistency. These findings were similar to those of other studies, where Cronbach's alpha ranged between 0.81 and 0.93 in an investigation of the psychometric properties of the AUDIT scale done by previous authors [58]. Furthermore, Cronbach's alpha values in other validation studies were 0.87 in French, 0.87 in Portuguese, 0.93 in Spanish, and 0.81 in Swedish [6-9]. In addition, in a study done by J. Hallit, et al. (2020), the Arabic version of the AUDIT scale was validated for use among Lebanese teenagers with a Cronbach's alpha of 0.978, close to the value found in the current study about the Lebanese population in general [4]. Hence, the Arabic version of the AUDIT scale showed to be a helpful tool in assessing problematic alcohol use in the Lebanese population.

Concurrent validity-hypothesis 3

Higher AUDIT scores were significantly associated with more alexithymia, depression, anxiety, and suicidal ideation in our study.

Previous findings suggest that the depressant characteristic of alcohol may instigate periods of depressed affect in individuals with PAU [59]. Furthermore, alcohol was found to be leading to depression, and it has been proposed that this link may be the consequence of genetic predisposition, in which the problematic use of alcohol triggers "genetic markers that increase the risk of depression" [60,61]. Li, et al. (2020) explained that PAU could play a role in causing depression due to confounding factors, such as socioeconomic status, gambling, education, and substance and tobacco use [62].

Higher anxiety was correlated with PAU, in line with previous findings showing this association [63,64]. Smith, et al. (2012) conducted a study explaining the factors that might affect the co-morbidity between PAU and anxiety, and this co-occurrence may be attributed to many factors, including a genetic factor that causes the presence of both disorders in an individual and anxiety sensitivity [65]. Kushner, et al. (2000) explained that pathological alcohol use contributes to the development of anxiety disorders because important anxiety symptoms are a biological, social, and psychological consequence of chronic PAU and/ or the withdrawal syndrome [66]. Furthermore, Haddad, et al. (2019) could demonstrate that anxiety disorders are a consequence of alcohol withdrawal [63]. Obeid, et al. (2020) showed that substance use disorders, namely alcohol, have been associated with anxiety and are highly prevalent in Lebanon and the region, which could explain the association between higher anxiety and PAU [19].

Our results also showed that suicidal ideation was highly associated with PAU, in agreement with previous findings [67,68]. As shown before, PAU is associated with depression, which may lead to an increase in suicidal ideation; in addition, PAU was linked to impulsive attempts at committing suicide, as well as it was suggested by a previous study that patients with PAU should be screened for psychiatric disorders and increased risk of suicidality [69]. Moreover, Hufford tried to understand the link between suicidality and PAU and found that alcoholics with suicidal ideation tend to score higher on personality scales of sociopathy, deviance, and impulsivity. In addition, the presence of co-morbid psychopathologies such as depression increases the risk of suicidal ideations among problematic alcohol users. Not to forget that negative life events could be significant mediators between PAU and suicidal ideation [70].

Prevalence of problematic alcohol use

Our results revealed that 49.6% of the participants had PAU, lower than in a population of college students and higher than in Lebanese adolescents [4,71]. This prevalence is also higher than that of PAU in the USA (6%) and Australia (22.7%) [72]. This proportion may be the result of the broad availability of alcohol in Lebanon, the lack of regulation and laws that prevent the sale of alcohol, and the normalization of alcohol use, especially in Mount Lebanon and Beirut [21,73].

Limitations

This study used a cross-sectional design, which means causation cannot be inferred. It could not determine the cause of PAU (whether it is from accidental alcohol, depression, or mood disorders). This study is retrospective, predisposing us to a recall bias, with a possible overestimation of factors correlated with PAU. Participants might have misunderstood some of the questions, which is a source of information bias. Information bias is present because answers were self-reported and not evaluated by a professional. The refusal rate predisposes us to a selection bias. Finally, a residual confounding bias is likely as well since not all factors associated with the dependent variable were anticipated in this study. Our results are not generalizable because of the high percentage of participants with a university education level.

Implications for practice

Alcohol consumption has witnessed an increase worldwide over the years, and more men and women have been reporting higher rates of alcohol use. Alcohol is related to many health problems, and the more it is consumed, the more it poses a risk of becoming a higher health hazard. With increased alcohol use comes a greater risk for disordered drinking behaviors and problematic alcohol use. Therefore, it is essential to have an adequate and reliable tool to assess this growing problem. The validation of this scale is beneficial as healthcare workers (psychiatrists, psychologists) can now use it to properly assess, detect, and, consequently, treat alcohol use disorders.

Conclusion

The AUDIT scale seems to show good factor validity, internal consistency, and concurrent validity and can be used by clinicians to screen for PAU among Lebanese adults. PAU correlates positively with depression, anxiety, and suicidal ideation, thus the importance of spreading awareness about alcohol consumption. Regular monitoring and screening for alcohol use and therapeutic interventions among the population are advised. The results might set out to be the first step towards implementing laws and regulations that control the problematic use of this psychoactive substance that leads to severe mental health problems.

Ethics Approval and Consent to Participate

The Psychiatric Hospital of the Cross Ethics and Research Committee approved this study protocol (HPC-013-2018). A written informed consent was obtained from each participant. All methods were performed in accordance with the relevant guidelines and regulations.

Consent for Publication

Not applicable.

Availability of Data and Materials

All data generated or analyzed during this study are not publicly available due the restrictions from the ethics committee (data are owned by a third-party organization). The dataset supporting the conclusions is available upon request to the corresponding author (SH).

Competing Interests

The authors have nothing to disclose.

Funding

None.

Authors Contribution

RA wrote the paper; SH and SO designed the study; SH carried out the analysis and interpreted the results; PS and HS edited the paper and reviewed its intellectual content; all authors read and approved the final manuscript; SO and SH were the project supervisors.

Acknowledgement

We would like to thank all participants and Dr. Marwan Akel and Miss Kassandra Fares for their help in the data collection and entry.

References

1. Alcohol, gender and drinking problems in low and middle income countries, World Health Organization, 2005.

2. Alcohol, World Health Organization, 2020.

3. AUDIT Translations, 2020.

4. J. Hallit, P. Salameh, C. Haddad, H. Sacre, M. Soufia, et al. Validation of the AUDIT scale and factors associated with alcohol use disorder in adolescents: Results of a National Lebanese Study, BMC Pediatr, 20(2020):205.

5. D.F. Reinert, J.P. Allen, The alcohol use disorders identification test: An update of research findings, Alcohol Clin Exp Res, 31(2007):185-199.

6. P. Gache, P. Michaud, U. Landry, C. Accietto, S. Arfaoui, et al. The Alcohol Use Disorders Identification Test (AUDIT) as a screening tool for excessive drinking in primary care: Reliability and validity of a French version, Alcohol Clin Exp Res, 29(2005):2001-2007.

7. M.E. Alvarado, M.L. Garmendia, G. Acuna, R. Santis, O. Arteaga, Assessment of the Alcohol Use Disorders Identification Test (AUDIT) to detect problem drinkers, Rev Med Chil, 137(2009):1463-1468.

8. R.O. Moretti-Pires, C.M. Corradi-Webster, Adaptation and validation of the Alcohol Use Disorders Identification Test (AUDIT) for a river population in the Brazilian Amazon, Cad Saude Publica, 27(2011):497-509.

9. H. Bergman, H. Kallmen, Swedish women have developed more risky and more harmful alcohol drinking habits. A survey of alcohol drinking changes among Swedes between 1997-2001, Lakartidningen, 100:1028-30.

10. Q. Li, T.F. Babor, W. Hao, X. Chen, The Chinese translations of Alcohol Use Disorders Identification Test (AUDIT) in China: A systematic review, Alcohol Alcohol, 46(2011):416-423.

11. T.S.K. Almarri, T.P.S. Oei, T. Amir, Validation of the alcohol use identification test in a prison sample living in the Arabian Gulf region, Subst Use Misuse, 44(2009):2001-2013.

12. J. Salame, B. Barbour, P. Salameh, Do personal beliefs and peers affect the practice of alcohol consumption in University students in Lebanon? East Mediterr Health J, 19(2013):340-347.

13. G.O. Boateng, T.B. Neilands, E.A. Frongillo, H.R. Melgar-Quinonez, S.L. Young, Best practices for developing and validating scales for health, social, and behavioral research: A Primer, Front Public Health, 6(2018):149.

14. E.G. Karam, Z.N. Mneimneh, A.N. Karam, Prevalence and treatment of mental disorders in Lebanon: A National epidemiological survey, Lancet, 367(2006):1000-1006.

15. N. Farran, Mental health in Lebanon: Tomorrow's silent epidemic, Ment Health Prev, 24(2021):200218.

16. Z. Cherri, P. Arcos Gonzalez, R. Castro Delgado, The Lebanese-Syrian crisis: Impact of influx of Syrian refugees to an already weak state, Risk Manag Healthc Policy, 9(2016):165-172.

17. S. Obeid, C. Haddad, W. Salame, N. Kheir, S. Hallit, Xenophobic attitudes, behaviors and coping strategies among Lebanese people toward immigrants and refugees, Perspect Psychiatr Care, 55(2019):710-717.

18. C. Abi Doumit, C. Haddad, H. Sacre, P. Salameh, M. Akel, et al. Knowledge, attitude and behaviors towards patients with mental illness: Results from a National Lebanese study, PLoS One, 14(2019):e0222172.

19. S. Obeid, M. Akel, C. Haddad, K. Fares, H. Sacre, et al. Factors associated with alcohol use disorder: The role of depression, anxiety, stress, alexithymia and work fatigue-a population study in Lebanon, BMC Public Health, 20(2020):245.

20. World Health Organization, Lebanon alcohol consumptions, 2020.

21. Ministry of Public Health, Mental health and substance use prevention, promotion and treatment, Beirut, 2015.

22. American Psychiatric Association, Diagnostic and statistical manual of mental disorders: DSM-5, Arlington, VA, 2013.

23. N. Lahoud, M. Zakhour, C. Haddad, Burnout and its relationships with alexithymia, stress, self-esteem, depression, alcohol use disorders, and emotional intelligence: Results from a Lebanese cross-sectional study, J Nerv Ment Dis, 207(2019):642-650.

24. S. Obeid, M. Akel, C. Haddad, Factors associated with alexithymia among the Lebanese population: Results of a cross-sectional study, BMC Psychol, 7(2019):80.

25. S Obeid, C Haddad, M Akel, K Fares, P Salameh, et al. Factors associated with the adults' attachment styles in Lebanon: The role of alexithymia, depression, anxiety, stress, burnout, and emotional intelligence, Perspect Psychiatr Care, 55(2019):607-617.

26. S. Obeid, C. Haddad, M. Zakhour, K. Fares, M. Akel, et al. Correlates of self-esteem among the Lebanese population: A cross-sectional study, Psychiatr Danub, 31(2019):429-439.

27. S. Obeid, N. Lahoud, C. Haddad, H. Sacre, M. Akel, et al. Factors associated with depression among the Lebanese population: Results of a cross-sectional study. Perspect Psychiatr Care, 56(2020):956-967.

28. S. Obeid, N. Lahoud, C. Haddad, H. Sacre, K. Fares, et al. Factors associated with anxiety among the Lebanese population: The role of alexithymia, self-esteem, alcohol use disorders, emotional intelligence and stress and burnout, Int J Psychiatry Clin Pract, 24(2020):151-162.

29. M. Zakhour, C. Haddad, P. Salameh, M. Akel, K. Fares, Impact of the interaction between alexithymia and the adult attachment styles in participants with alcohol use disorder, Alcohol, 83(2020):1-8.

30. Y. El Frenn, M. Akel, S. Hallit, S. Obeid, Couple's satisfaction among Lebanese adults: validation of the toronto alexithymia scale and couple satisfaction index-4 scales, association with attachment styles and mediating role of alexithymia, BMC Psychol, 10(2022):13.

31. S. Obeid, C.A.E. Hallit, C. Haddad, Z. Hany, S. Hallit, Validation of the Hamilton Depression Rating Scale (HDRS) and sociodemographic factors associated with Lebanese depressed patients, Encephale, 44(2018):397-402.

32. S. Hallit, C. Haddad, R. Hallit, M. Akel, S. Obeid, Validation of the Hamilton anxiety rating scale and state trait anxiety inventory a and B in Arabic among the Lebanese population, CEGH, 8(2020):1104-1109.

33. M. Zakhour, C. Haddad, H. Sacre, K. Fares, M. Akel, et al. Suicidal ideation among Lebanese adults: Scale validation and correlates, BMC Psychiatry, 21(2021):100.

34. M. Chahine, P. Salameh, C. Haddad, H. Sacre, M. Soufia, et al. Suicidal ideation among Lebanese adolescents: Scale validation, prevalence and correlates, BMC Psychiatry, 20(2020):304.

35. R.G. Downey, C.V. King, Missing data in likert ratings: A comparison of replacement methods, J Gen Psychol, 125(1998):175-191.

36. J.F. Hair, G.T.M. Hult, C. Ringle, M. Sarstedt, A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), Sage, 2017.

37. P. Mishra, C.M. Pandey, U. Singh, A. Gupta, C. Sahu, et al. Descriptive statistics and normality tests for statistical data, Ann Card Anaesth, 22(2019):67-72.

38. V. Swami, D. Barron, Translation and validation of body image instruments: Challenges, good practice guidelines, and reporting recommendations for test adaptation, Body image, 31(2019):204-220.

39. U. Lorenzo-Seva, P.J. Ferrando, FACTOR: A computer program to fit the exploratory factor analysis model, Behav Res Methods, 38(2006):88-91.

40. D.J. Mundfrom, D.G. Shaw, T.L. Ke, Minimum sample size recommendations for conducting factor analyses, Int J Test, 5(2005):159-168.

41. L.A. Clark, D. Watson, Construct validity: Basic issues in objective scale development, Psychol Measurement, 28(1995):61-75.

42. J.F. Hair, Multivariate data analysis, 2009.

43. M.E. Timmerman, U. Lorenzo-Seva, Dimensionality assessment of ordered polytomous items with parallel analysis, Psychol methods, 16(2011):209.

44. C.Y. Yu, Evaluation of model fit indices for latent variable models with categorical and continuous outcomes, AERA, 2002.

45. B. Tabachnick, L. Fidell, Using multivariate statistics,

7th ed, Pearson Publishers, 2019.

46. B.M. Byrne, Structural equation modeling with Mplus: Basic concepts, applications, and programming, Routledge, 2013.

47. F.F. Chen Sensitivity of goodness of fit indexes to lack of measurement invariance, Struct Equ Modeling, 14(2007):464-504.

48. R.J. Vandenberg, C.E. Lance, A review and synthesis of the measurement in variance literature: Suggestions, practices, and recommendations for organizational research, Organ Res Methods, 3(2000):4-70.

49. T.J. Dunn, T. Baguley, V. Brunsden, From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation, Br J Psychol, 105(2014):399-412.

50. F. Fekih-Romdhane, D. Malaeb, M. Dabbous, R Hallit, S. Obeid, Psychometric properties of an Arabic translation of the External and Internal Shame Scale (EISS), BMC Psychiatry, 23(2023):242.

51. W.S. Santos, V.V. Gouveia, D.P. Fernandes, S.S. Souza, A.Sd.M. Grangeiro, Alcohol Use Disorder Identification Test (AUDIT): Exploring its psychometric parameters, J Bras de Psiquiatr, 61(2012):117-123.

52. K. Pereira de Araújo Sousa, E. Diógenes de Medeiros, P. Cavalcante Bezerra de Medeiros, Validity and reliability of the Alcohol Use Disorders Identification Test (AUDIT) in students at a Brazilian University, Cienc Psicol, 14(2020).

53. G. Gmel, J.L. Heeb, J. Rehm, Is frequency of drinking an indicator of problem drinking? A psychometric analysis of a modified version of the alcohol use disorders identification test in Switzerland, Drug Alcohol Depend, 64(2001):151-163.

54. S.R. Doyle, D.M. Donovan, D.R. Kivlahan, The factor structure of the Alcohol Use Disorders Identification Test (AUDIT), J Stud Alcohol Drugs, 68(2007):474-479.

55. K.B. Carey, M.P. Carey, P.S. Chandra, Psychometric evaluation of the alcohol use disorders identification test and short drug abuse screening test with psychiatric patients in India, J Clin Psychiatry, 64(2003):767-774.

56. A. Klimkiewicz, A. Jakubczyk, A. Mach, Psychometric properties of the polish version of the Alcohol Use Disorders Identification Test (AUDIT), Drug Alcohol Depend 218(2021):108427.

57. V. Lopez, B. Paladines, S. Vaca, R. Cacho, J. Fernandez-Montalvo, et al. Psychometric properties and factor structure of an Ecuadorian version of the Alcohol Use Disorders Identification Test (AUDIT) in college students, PLoS One, 14(2019):e0219618.

58. C. de Meneses-Gaya, A.W. Zuardi, S.R. Loureiro, J.A.S. Crippa, Alcohol Use Disorders Identification Test (AUDIT): An updated systematic review of psychometric properties, Psychol Neurosci, 2(2009):83.

59. M.A. Schuckit, J.E. Tipp, M. Bergman, W. Reich, V.M. Hesselbrock, et al. Comparison of induced and independent major depressive disorders in 2,945 alcoholics, Am J Psychiatry, 154(1997):948-957.

60. A. Farre, J. Tirado, N. Spataro, M. Alías-Ferri, M. Torrens, et al. Alcohol induced depression: Clinical, biological and genetic features, J Clin Med, 9(2020).

61. D.M. Fergusson, J.M. Boden, L.J. Horwood, Tests of causal links between alcohol abuse or dependence and major depression, Arch Gen Psychiatry, 66(2009):260-266.

62. J. Li, H. Wang, M. Li, Q. Shen, X. Li, et al. Effect of alcohol use disorders and alcohol intake on the risk of subsequent depressive symptoms: A systematic review and meta-analysis of cohort studies, Addiction, 115(2020):1224-1243.

63. C. Haddad, M.J. Darwich, S. Obeid, H. Sacre, M. Zakhour, et al. Factors associated with anxiety disorders among patients with substance use disorders in Lebanon: Results of a cross-sectional study, Perspect Psychiatr Care, 56(2020):745-752

64. M.G. Kushner, K.J. Sher, Comorbidity of alcohol and anxiety disorders among college students: Effects of gender and family history of alcoholism, Addict Behav, 18(1993):543-552.

65. J.P. Smith, C.L. Randall, Anxiety and alcohol use disorders: Comorbidity and treatment considerations, Alcohol Res, 34(2012):414-431.

66. M.G. Kushner, K. Abrams, C. Borchardt, The relationship between anxiety disorders and alcohol use disorders: A review of major perspectives and findings, Clin Psychol Rev, 20(2000):149-171.

67. P. Baiden, C. Mengo, G.O. Boateng, E. Small, Investigating the association between age at first alcohol use and suicidal ideation among high school students: Evidence from the youth risk behavior surveillance system, J Affect Disord, 242(2019):60-67.

68. J.E. Jeong, S.H. Joo, C. Hahn, D.J. Kim, T.S. Kim, Gender-specific association between alcohol consumption and stress perception, depressed mood, and suicidal ideation: The 2010-2015 KNHANES, Psychiatry Investig, 16(2019):386-396.

69. K.R. Conner, V.M. Hesselbrock, M.A. Schuckit, Precontemplated and impulsive suicide attempts among individuals with alcohol dependence, J Stud Alcohol, 2006;67(1):95-101.

70. M.R. Hufford, Alcohol and suicidal behavior, Clin psychol rev, 21(2001):797-811.

71. L.A. Ghandour, E.G. Karam, W.E. Maalouf, Lifetime alcohol use, abuse and dependence among University students in Lebanon: Exploring the role of religiosity

in different religious faiths, Addiction, 104(2009):940-948.

72. M.D. Glantz, C. Bharat, L. Degenhardt, N.A. Sampson, The epidemiology of alcohol use disorders cross-nationally: Findings from the World mental health surveys, Addict Behav, 102(2020):106128.

73. A. Rayan, M. Fawaz, Cultural misconceptions and public stigma against mental illness among Lebanese University students. Perspect Psychiatr Care, 54(2018):258-265.