

Depression, Anxiety, and Stress among Adults in Saudi Arabia

By

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Abstract

Background

In Saudi Arabia, With Its Tightly Knitted Communities, There Is A Focus on Collectivistic Ideals That Accentuates Group Goals Over Individualistic Aims. However, Western Culture Constitutes A Pervasive Individualistic Milieu Emphasizing Personal Choice and Rights. We Set to Validate the Psychometric Properties of Dass-21 In the Saudi Arabian Culture, As No Studies to Date Have Provided In-Depth Results for The Arabic Adaptation Of The Dass-21 Questionnaire.

Methods

This Study Was Descriptive And Included Both Primary And Secondary Data. The Primary Data Source Was A Structured Dass Questionnaire. Cronbach's Alpha And Hierarchical Omega Were Conducted To Analyze The Consistency Of The Total Dass-21 Scale And Its Three Subscales. Confirmatory Factor Analysis Was Performed On The Data. Different Factor Structures, Including One-Factor, Two-Factor, Three-Factor, And Four-Factor Structures, Were Examined And Compared In Terms Of Absolute Fit Indices That Included The Chi-Squared Test, Root Mean Square Error Of Approximation (Rmse), Comparative Fit Index (Cfi), Goodness-Of-Fit Index (Gfi), Root Mean Square Residual (Rmr), And Standardized Root Mean Square Residual (Srmr).

Results

The Present Study Is Focused On The Evaluation Of The Psychometric Properties Of The Arabic Dass-21 (Depression Anxiety Stress Scale). Dass-21 Is A 21-Item Questionnaire To Measure Psychometric Properties. The Total Dass-21 Score's Reliability Coefficient (Cronbach's Alpha) Was 0.94, Indicating Excellent Internal Consistency. The Three-Factor Model Fit The 21-Item Dataset Reasonably Well. Moreover, Our Study Examined The Good Reliability, Internal Consistency, And Convergent Validity Of The Arabic Adaptation Of Dass-21, Which Confirmed That The Current Three-Factor Structure For The Arabic Version Of Dass-21 Is Acceptable.

Limitations

The Study Involved 1,235 Participants Of Different Backgrounds In Saudi Arabia. It Is A Large-Scale Cross-Sectional Study of the Arabic Adaptation Of The Dass-21 Scores.

Conclusions

The Findings Of Our Study Concluded That Arabic Dass-21 Is Helpful In Many Public And Secondary Health Settings To Detect Depressive, Anxiety, And Stress Symptoms.

Keywords: Depression Anxiety Stress Scale Dass-21, Saudi Arabia, Psychometric Properties

Introduction

Depressive Illness Is A Leading Cause Of Disability Throughout The Globe, As Stated By The World Health Organization (Who). Over 264 Million People Worldwide Suffer From Depressive Disorders (World Health Organization, 2020). Almost 7.5% Of All Disability Years Were Caused By A Depressive Illness (Compared To 3.4% Years Of Disability Caused By An Anxiety Disorder). Moreover, 40.5% Of Disability- Adjusted Life Years (Dalys) Could Be Attributed To The Burden Of Depressive Illness, And 14.6% Of Dalys To Anxiety Disorders. Hence, Depression Is Considered By The Who To Be The Top Contributor To Worldwide Illness-Related Disability, Whereas Anxiety Disorder Ranks Sixth In Global Disability Causation (World Health Organization, 2017). The Arabic Cultural Context May Not Conform Perfectly To Westernized Measurement Scales. Cultural Variations May Affect The Depth And Range Of Emotional Expression Of Respondents And The Interpretation Of Individual Questions. That Was The Main Drive For Several Researchers To Validate The Dass-21 Across The Asian Continent (Oei Et Al., 2013). The Objective Of The Current Investigation Was To Examine The Psychometric Properties Of The Arabic Dass-21 Questionnaire. We Also Aimed To Evaluate The Factor Structure Of The Arabic Dass-21 Questionnaire, Examining Its Internal Consistency And Convergent, Discriminant, And Nomological Validity In A Large-Scale Sample Of Saudi Arabia Citizens.

Literature Review

The Dass-21 Was First Proposed By Lovibond And Lovibond (1995). It Is An Established Self-Report Questionnaire Composed Of A Total Of 21 Questions. The Main Objective Of The Work Of Lovibond And Lovibond (1995) On Dass-21 Was To Provide A Brief, Freely Available Measurement Scale That Maximizes The Discrimination Between Depressive And Anxiety Symptoms. Henry And Crawford (2005) In The United Kingdom Evaluated The Psychometric Properties Of Dass-21 In A Large Sample Of Nonclinical Adult Participants. They Assessed Its Construct Validity And Discriminatory Power In Separating The Three Underlying Constructs (Namely, Depression, Stress, And Anxiety). They Confirmed The Best Fit For A Quadripartite Model Structure By Adding A "Psychological Distress" Factor To The Three Original Dimensions Of The Dass-21. A Turkish Version Of Dass-21 Was Found To Have Excellent Discriminant And Stable Psychometric Properties (Hekimoglu Et Al., 2012). A Group Of German Researchers Contrasted The Psychometric

Properties Of The Dass-21 Among (N = 950) Healthy Volunteers And Patients With Chronic Pain (Nilges And Essau, 2015). They Found That The Depression Subscale Improved Sensitivity And Specificity Compared To The Hospital Anxiety And Depression Scale. Moreover, The Dass-21 Scale Was Translated Into Different Languages With Favourable Psychometric Properties Shown Upon Preliminary Validation Across Cultures. Western Cultural Context Provided Consistent Psychometric Characteristics For Dass-21, Although There Are Differences In Translations (Scholten Et Al., 2017). Egyptian Researchers Validated An Arabized Version Of The Dass-21 Among 149 Patients With Substance Use Disorders (Ali Et Al., 2017). They Calculated Coefficients Of Reproducibility And Scalability And Found Them Even Less Acceptable. They Found Several Items To Be Quite Difficult And Of Low

Discriminatory Power. They Regarded These Items As “Problematic” And Warranted Further Examination. The Factor Structure Was Reported To Be Consistent And Validity Measures To Be Quite Good (Lee, 2019). A Group Of Researchers From Brunei Validated The Psychometric Properties Of Dass-21 By Surveying A Large Sample Of Nursing Students Three Times (Teo Et Al., 2019). They Found Normative Stress Levels Were Mild And Normative Anxiety Levels Moderate. However, They Noted That The Discriminant Validity Was Poor. They Suggested A Quadripartite Final Dass-21 Model And Recommended The Dass-21 For Use In The Asian Population Until Further Validation Is Done. Recently, A Study Surveyed College Students In Eight Different Jurisdictions And Concluded The Unidimensional Structure Of Dass-21 (Zanon Et Al., 2021). This Is Corroborated By The Fact That The Only Arabic Study That Attempted To Evaluate The Psychometric Properties Of The Dass-21 Was Conducted On A Homogeneous Clinical Group Of Substance Use Disorder Patients And Concluded The Dass-21 Unidimensional Structure (Ali And Green, 2019). In A Recent Study Conducted In Two Different Cultural Contexts, Namely, Western And Eastern Cultures, There Was A Discrepancy In Measurement Invariance (Bibi Et Al., 2020). A Partial Weak Measurement Invariance In The Stress Scale Was Observed Among European And Asian Participants. A Recent Saudi- Based Study Utilized The Dass-21 In Investigating The Stress Levels Among Jazan University Students And Their Sleep Quality (Mahfouz Et Al., 2020).

Based On The Above Review, The Development Of Measurement Scales For Depression And Anxiety Is Required. Very Little Is Known About Arabic Dass-21 In Terms Of Advanced Psychometric Properties Because Only A Dearth Of Studies Evaluated The Dass-21 In Clinical Samples. Even Far Less Work Was Done In Terms Of Psychometric Properties In Non-English Dass-21 Measurement Scales In Nonclinical Populations. Hence, To Fill The Research Gap, The Objective Of The Current Investigation Was To Examine The Psychometric Properties Of The Arabic Dass-21 Questionnaire With Context To Citizens Based In Saudi Arabia.

Material And Methods

This Study Was Descriptive And Included Both Primary And Secondary Data. The Primary Data Source Was A Structured Dass Questionnaire. Cronbach’s Alpha And Hierarchical Omega Were Conducted To Analyze The Consistency Of The Total Dass-21 Scale And Its Three Subscales. Confirmatory Factor Analysis Was Performed On The Data. Different Factor Structures, Including One-Factor, Two-Factor, Three-Factor, And Four-Factor Structures, Were Examined And Compared In Terms Of Absolute Fit Indices That Included The Chi-Squared Test, Root Mean Square Error Of Approximation (Rmse), Comparative Fit Index (Cfi), Goodness-Of-Fit Index (Gfi), Root Mean Square Residual (Rmr), And Standardized Root Mean Square Residual (Srmr). Weighted Least Square Mean And Variance Adjusted (Wlsmv) Estimators Were Also Applied. Furthermore, The Dass-21 Subscales Consisted Of Three Subscales, Such As Depression Scale, Anxiety Scale, And

Distress Scale. Each Consisted Of 7 Items. Subscores For Depression, Anxiety, And Distress Stress Were Obtained By Adding Up The Scores For The Respective Items. The Depression Scale Contained Items That Examined The Extent Of Anhedonia. The Anxiety Scale Assessed Autonomic Arousal.

The Distress Scale Was Designed To Detect Chronic Nonspecific Arousal. Correlation Analysis Was Conducted Between The Underlying Three Factors To Examine Convergent And Discriminant Validity Used In The Study.

Results And Discussions

Reliability And Internal Consistency Of The Arabic Dass-21

Cronbach's Alpha For The Total Dass-21 Score Was 0.94 (95% Confidence Interval (Ci) Between 0.93 And 0.94). The Reliability Coefficient For The Depression Subscale Of The Arabic Dass-21 Was 0.87 (95% Ci Between 0.86 And 0.88). The Cronbach's Alpha Reliability Coefficient For The Anxiety Subscale Was

0.84 (95% Ci Between 0.82 And 0.85) And For The Stress Subscale Was 0.86 (95% Ci Between 0.85 And 0.87). All The Scales Indicated Good Internal Consistency.

Table 1. *Baseline Demographics of the study participants.*

Factor	Count (n)/mean	Percentage/SD	DASS-21 mean	P value
Sex Males	481	38.9%	17.1	0.0001511
Females	754	61.1%	20.0	
Age				0.000498
18 to 25	653	52.9%	20.2	
26 to 33	230	18.6%	18.1	
34 to 41	149	12.1%	17.2	
42 to 49	121	9.8%	15.7	
50 to 57	65	5.3%	15.7	
over 58	17	1.4%	22.7	
Marital Status				0.00118
Married	414	33.5%	16.8	
Widow	1	0.1%	33.0	
Single	779	63.1%	19.8	
Divorced	41	33.2%	20.0	0.00000218
Employment				
Employee	462	37.4%	16.4	
Student	558	45.2%	20.5	
Unemployed	214	17.3%	19.8	0.653
Education				
Intermediate	38	3.1%	18.3	
Secondary	254	20.6%	18.9	
University	827	67%	19.0	0.0135
Postgraduate	116	9.4%	17.4	
683	55.3%	17.8		
Region				0.0135
Central	355	28.7%	19.4	
Northern	42	3.4%	23.0	
Southern	57	4.6%	21.7	
Western	98	7.9%	20.4	2.45X10 ⁻¹²
Psychiatric History	104	8.4%	27.4 (No = 18.0)	
Current mental issues	220	17.8%	32.1 (No = 15.9)	
On psych medications	65	5.3%	29.2 (No = 18.3)	
Ruqia history	285	23.1%	24.4 (No = 17.2)	9.97X10 ⁻¹¹
Smoking	166	13.4%	21.6 (No = 18.4)	3.32X10 ⁻¹⁶
Substance use	22	1.8%	25.5 (No = 18.7)	0.00387
Psychological issues	639	51.7%	23.9 (No = 13.3)	0.0181
				< 2X10 ⁻¹⁶

The respondents were 38.9% males and 61.1% females. Most (52.9%) participants were in the 18-to- 25-year age group. Moreover, 33% of the participants were married, 63% were single, and 33% were divorced. The majority of respondents were students (45%), out of which 67% were university students. The percentage of working people was 37% and 17% of the participants were unemployed. The majority of participants (55%) belonged to the central region. It was found that 17% of the participants were currently having mental issues; however, 23% had a psychiatric history related to substance abuse. Normative Values in the Saudi Population

Table 2. Normative values for the DASS-21 subscales among our Saudi subjects.

Subscale	Normal	Mild	Moderate	Severe
Depression	567 (45.9%)	163 (13.2%)	220 (17.8%)	285 (23.1%)
Anxiety	522 (42.3%)	87 (7%)	205 (16.7%)	421 (34.1%)
Distress	585 (47.4%)	215 (17.4%)	239 (19.4%)	196 (15.9%)

The normative mean DASS-21 score was 18.8 (SD = 13.4), ranging between 0 and 63; the median DASS-21 score was 16. The normative mean DASS-21 depression subscore was 6.1 (SD = 5.1), ranging between 0 and 21; the median DASS-21 depression subscore was 5. The normative mean DASS-21 anxiety was 5.5 (SD = 4.6), ranging between 0 and 21; the median DASS-21 anxiety subscore was 5. The normative mean DASS-21 stress subscore was 7.3 (SD = 5.0), ranging between 0 and 21; the median DASS-21 stress subscore was 7.

Confirmatory Factor Analysis

Confirmatory factor analysis of a three-factor model was performed after removing the two poorly performing items.

Table 3. Comparison of four models for the DASS-21 factor structure.

Model	Chi-squared (df)	RMSEA (90% CI)	CFI	TLI	SRMR
One-factor	1238 (189)	0.067 (0.064 to 0.071)	0.989	0.988	0.067
Two-factor	1025 (188)	0.060 (0.056 to 0.064)	0.992	0.991	0.049
Three-factor	701 (186)	0.047 (0.044 to 0.051)	0.995	0.994	0.042
Four-factor	550 (183)	0.040 (0.036 to 0.044)	0.976	0.996	0.039
Three-factor*	838 (186)	0.053 (0.050 to 0.057)	0.993	0.993	0.046
Three-factor [missing items 1 & 12]	467 (149)	0.042 (0.037 to 0.046)	0.996	0.995	0.040

CFI, comparative fit index; TLI, Tucker–Lewis index; RMSEA, root mean square error of approximation; CI, confidence interval; df, degrees of freedom; SRMR, standardized root mean square residuals. Three-factor*: the original three-dimensional structure.

Table 4. Items that loaded differently from the original DASS-21 three-factor structure.

Dimension movement	Item	Verbatim
from depression to stress	5	I found it difficult to work up the initiative to do things
from anxiety to stress	9	I was worried about situations in which I might panic and make a fool of myself
from stress to depression	11	I found myself getting agitated
from stress to depression	14	I was intolerant of anything that kept me from getting on with what I was doing

Table 5. Items to be excluded for the original DASS-21 three-factor structure to be preserved.

Dimension	Item	Verbatim
Stress	1	I found it hard to wind down

Stress	12	I found it difficult to relax
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Discriminant Validity Analysis

The discriminant validity was poor for the three constructs.

Table 6. *The multiply operationalized correlation of the three constructs of the DASS-21 scale*

Construct	Mean	SD	Biserial correlation	P value
Depression	0	0.7449	0.8020	< 0.0001
Stress	0	0.7396	0.8281	< 0.0001
Anxiety	0	0.7125	0.7710	< 0.0001

The discriminant validity was poor for the three constructs.

Convergent Validity Analysis

Correlation coefficients were interpreted as follows: 0–0.19 = very weak; 0.20–0.39 = weak; 0.40–0.59

= moderate; 0.60–0.79 = strong; 0.80–1.0 = very strong (Evans, 1996).

Table 7. *Convergent validity of the DASS-21 items.*

Item	Construct	Biserial correlation	Interpretation	P value
DASS-1	Stress	0.6831	Strong	< 0.0001
DASS-2	Anxiety	0.6373	Strong	< 0.0001
DASS-3	Depression	0.6746	Strong	< 0.0001
DASS-4	Anxiety	0.7074	Strong	< 0.0001
DASS-5	Depression	0.6137	Strong	< 0.0001
DASS-6	Stress	0.6855	Strong	< 0.0001
DASS-7	Anxiety	0.7060	Strong	< 0.0001
DASS-8	Stress	0.7713	Strong	< 0.0001
DASS-9	Anxiety	0.6628	Strong	< 0.0001
DASS-10	Depression	0.7750	Strong	< 0.0001
DASS-11	Stress	0.8200	Very Strong	< 0.0001
DASS-12	Stress	0.8032	Very Strong	< 0.0001
DASS-13	Depression	0.8092	Very Strong	< 0.0001
DASS-14	Stress	0.6971	Strong	< 0.0001
DASS-15	Anxiety	0.7244	Strong	< 0.0001
DASS-16	Depression	0.7922	Strong	< 0.0001
DASS-17	Depression	0.7449	Strong	< 0.0001
DASS-18	Stress	0.7170	Strong	< 0.0001
DASS-19	Anxiety	0.7643	Strong	< 0.0001
DASS-20	Anxiety	0.7852	Strong	< 0.0001
DASS-21	Depression	0.8051	Very Strong	< 0.0001

Clearly, all the items demonstrated strong convergent validity, with items 11, 12, 13, and 21, whose convergent validity was very strong.

Adjusted Effect of Demographic and Clinical Factors on DASS-21 Score.

Table 8 and the figures in Supplementary File provide a detailed account of the unadjusted and adjusted effect of background factors on the DASS-21 score. The DASS-21 was significantly elevated in the over 85-year-old category ($p = 7.869 \times 10^{-05}$), single participants ($p = 0.0042197$), students ($p = 0.0001620$), all regions compared to the central

region ($p = 1.666 \times 10^{-09}$, for Southern region), smokers ($p = 9.323 \times 10^{-07}$), and those with substance use issues ($p = 0.0015458$).

Table 8. *Adjusted effect of baseline demographics of the study participants on their DASS-21 score.*

Demographic factor	Estimate	SE	z value	P value
Sex: male	-0.0684617	0.0181288	-3.7764	0.0001591 ***
Age: 26 to 33	-0.0363249	0.0259297	-1.4009	0.1612443
Age: 34 to 41	-0.0748820	0.0337879	-2.2162	0.0266753 *
Age: 42 to 49	-0.0121805	0.0383085	-0.3180	0.7505165
Age: 50 to 57	0.0052474	0.0434674	0.1207	0.9039119
Age: over 58	0.2395384	0.0606677	3.9484	7.869×10^{-05} ***
Marital: married	0.0260417	0.0396886	0.6562	0.5117260
Marital: single	0.1124530	0.0393020	2.8613	0.0042197 **
Marital: widowed	1.1503708	0.1810019	6.3556	2.077×10^{-10} ***
Postgraduate	-0.1478716	0.0457401	-3.2329	0.0012255 **
Education: secondary	-0.0421562	0.0420877	-1.0016	0.3165240
Education: university	-0.1684241	0.0407134	-4.1368	3.522×10^{-05} ***
Student	0.0984456	0.0260992	3.7720	0.0001620 ***
Unemployed	0.0297133	0.0230027	1.2917	0.1964511
Region: eastern	-0.0317254	0.0167884	-1.8897	0.0587944
Region: northern	0.1777087	0.0344441	5.1593	2.478×10^{-07} ***
Region: southern	0.1846474	0.0306345	6.0274	1.666×10^{-09} ***
Region: western	0.0809769	0.0250178	3.2368	0.0012089 **
Psychiatric history	0.0906179	0.0260272	3.4817	0.0004983 ***
Current mental issues	0.4644987	0.0166554	27.8888	$< 2.2 \times 10^{-16}$ ***
Psych meds	0.0659120	0.0311911	2.1132	0.0345863 *
Ruqia history	0.2564579	0.0153681	16.6877	$< 2.2 \times 10^{-16}$ ***
Smoking	0.1048805	0.0213805	4.9054	9.323×10^{-07} ***
Substance use	0.1411576	0.0445862	3.1659	0.0015458 **
Psych pressures	0.3792604	0.0155212	24.4350	$< 2.2 \times 10^{-16}$ ***

Conclusion

Our study shows the excellent reliability, internal consistency, and convergent validity of the Arabic adaptation of DASS-21. The estimated reliability coefficient, Cronbach's alpha, for the total DASS-21 score was found to be 0.94, indicating good internal consistency. Results for Cronbach's alpha estimates for the respective subscales in the Arabic DASS-21 version were found to be 0.86, 0.84, and 0.87, respectively. Our results confirmed the high correlation between the different factors in the Arabic DASS-21. On the contrary, our results supported the tripartite factor structure of the Arabic adaptation for the DASS-21 and, simultaneously, reported on the high interfactor correlation. We also confirmed

the acceptability of the current three-factor structure for the DASS-21 in its Arabic version. Our results do provide evidence to the tripartite model for Arabic DASS-21. Among our nonclinical sample of Saudi adults, we found the normative mean Arabic DASS-21 total score to be 18.8. Depression subscale mean was 6.1 and the anxiety subscore mean was 5.5. Furthermore, distress subscale mean score among our Saudi sample was 7.3. Thus, we consolidate the position of DASS-21 as quite reliable and consistent in terms of its underlying three constructs. We may conclude that, in its current format, Arabic DASS-21 can be used in many public and secondary health settings to detect depressive, anxiety, and stress symptoms.

Future Implications of Research

Future research should directly compare Saudi and European cultures in terms of total

DASS-21 results and their subscales, particularly the stress subscale. Further explorations of the psychometric characteristics of Arabic DASS-21 should include focusing on measurement invariance of the three underlying subscales compared to the original English version. Qualitative and quantitative studies should also evaluate the cultural differences in terms of expression of depressive and anxiety symptoms between Saudi Arabian and Western subjects. Certainly, further research should attempt to make direct comparisons in terms of factor structure between homogeneous and heterogeneous clinical and nonclinical samples.

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Conflicts Of Interests

There is no conflict of interests between the authors

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Supplementary Materials

The figures in Supplementary File provide a detailed account of the unadjusted and adjusted effect of background factors on the DASS-21 score.

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