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Psychometric Properties of the Greek-University of California, Los Angeles Loneliness Scale-Version 3 in a Sample of People with Human Immunodeficiency Virus

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Abstract

Aims: The aim of this study was to validate the Greek translation of the University of California, Los Angeles Loneliness Scale (UCLA) in Greek adults with HIV. Methods: The UCLA Loneliness scale (version 3) was administered to 140 people with HIV. Participants also completed the Greek Hospital Anxiety and Depression Scale (G-HADS). Validity and reliability analyses were performed. Results: The Cronbach's α coefficient for the total UCLA score was 0.9. Test-retest reliability analysis in a subgroup of patients (n = 40) revealed good short-term stability over a 2-week interval (ICC 0.8 - 0.9, $p < 0.0005$). Exploratory factor analysis generated a three factors structure for the Greek translation. Convergent validity was supported through the scale's high correlations with G-HADS anxiety (0.382, $p < 0.01$) and depression (0.524, $p < 0.005$). Conclusion: The Greek UCLA Loneliness scale (version 3) is a valid and reliable instrument that can be usefully implemented into clinical practice in order to diagnose and treat loneliness among the Greek HIV positive patients.

Keywords

UCLA Loneliness Scale, People with HIV, Reliability, Validity

1. Introduction

Human immunodeficiency virus (HIV) is the virus that causes AIDS (acquired immu-

nodeficiency syndrome). People with HIV have to deal with loneliness, stigma, depression, anxiety, as well as social and health consequences [1].

Feeling of loneliness is the unpleasant experience when peoples' network of social relationships is deficient including notions of isolation and disconnection [2] [3], associated with mental and health outcomes [4].

There are many definitions about loneliness either as a biological construct or as a discrepancy between desired and actual social relationship [5] [6] [7].

Moustakas [8] described the existential loneliness as the forced separation from others. Perlman and Peplau [3], explained loneliness as a result of dysfunctional relationships, with impact to humans stated that there is a significant difference between the subjective feeling of loneliness and the objective state of social isolation. Although there is a different theoretical background behind these definitions, they all agree in the impact of loneliness in people. Lonely individuals perceive the social world as a threatening place, expect more negative social interactions, and recall more negative social information so they distance themselves from the social world. This loop creates feelings of hostility, stress, pessimism, anxiety and low self esteem activating the neurobiological and behavioral mechanisms that affect health outcomes [9] [10] [11].

People with HIV have to deal not only with the infection, but also with the emotional stress caused by the fact that HIV is a chronic, life threatening disease, and the prejudice that blames the people for being HIV, positive. These stressors, psychosocial factors the social isolation, poor social support and loneliness make people with HIV experience a cluster of symptoms that are extremely complicated [12].

Loneliness is one of the most important sources of emotional and psychological distress affecting life of people with HIV, as it is the result of emotional and social isolation, existential loneliness and stigmatization, as a common psychological symptom affects almost 50% of the people with HIV [13]. In addition, the relationship between loneliness, stress and inflammation seemed to be critical to understanding the health implications of loneliness [14]. Similarly, compared with people more socially connected, people who experienced loneliness exhibited less natural killer cell activity [15] while men infected with HIV had higher human herpesvirus 6 antibody titers related to the more socially connected counterparts [16]. Additionally, loneliness in people with HIV seemed to be related with CD-4 (cluster of differentiation 4) as more lonely patients have decreased CD-4 than less lonely patients [17].

Clinicians usually underestimated the importance of loneliness focusing more with the infection and/or the appropriate treatment [13].

Many instruments have been constructed measuring loneliness, in different population: a) The De Jong Gierveled short scales for emotional and social loneliness [18], b) The Duke Social Support Index [19] and c) the Loneliness scale (UCLA) [20]. Russell [20] was the first that evaluated the psychometric properties of UCLA-version 3 using data from prior studies of teachers, college students and elderly. The results showed

that UCLA was highly reliable, with internal consistency ranging from 0.89 to 0.94, and test retest reliability over a year period (r = 0.73).

Several studies [21]-[26] have shown the UCLA questionnaire is a valid, objective and reliable instrument.

The UCLA is a systematic attempt to embody verbal descriptors in loneliness assessment in a sample of Greek HIV patients. The aims were to access the Greek version of the UCLA for its applicability, reliability, and validity on a sample of people with HIV.

2. Methods

2.1. Patients and Procedure

The study took place between January 2014 and July 2014 in the Greek General Hospital Red Cross, in Special Infection Unit in Athens Greece. The sample consisted of Greek patients with an HIV diagnosis. The questionnaire was administered in two different times with an interval of 7 days.

Inclusion criteria were the following: a) participants were at least 18 years old b) participants should be capable of communicating effectively with the study personnel with fluency in Greek language. Exclusion criteria included recent diagnosis.

The original validation sample consisted of 140 HIV patients among the 600 patients that are treated there, and it was drawn using the method of random sampling. They all completed the questionnaire and 40 of them completed the same questionnaire 7 days later for test re-test analysis. All participants have completed a written informed consent for their participation in the current study. Additionally, hospital's ethics committee approved this study, which was conducted according to Declaration of Helsinki principles and according to guidelines for good clinical practice.

The sociodemographic characteristics are presented in **Table 1**.

2.2. Instruments

2.2.1. UCLA

The UCLA Loneliness Scale (version 3), [20] is a 20-item scale that measures the subjective feeling of loneliness. For each question, there is a 4-point scale (1 = never, 2 = rarely, 3 = some times, 4 = always).The range of scores is between 20 to 80 (20 = "I don't feel loneliness" and 80 = "I feel very lonely". Higher scores indicate higher levels of loneliness. UCLA Loneliness scale is a valid and reliable instrument, with cronbach α (alpha) = 0.89 to 0.97 and test-retest reliability (r = 0.73).

2.2.2. HADS

The Greek version of the Hospital Anxiety and Depression Scales (G-HADS) is a self assessment mood scale specifically designed for use in hospital setting. It is a brief self-report 14-item scale designed to measure the two most common aspects of mood disorder (anxiety and depression) on a 0 - 3 verbal numerical scale (0: No distress-3: maximum distress). It is a useful screening measure for anxiety and depression with cronbach's alpha for HADS-A: 0.83 and for HADS-D: 0.82 [27].

Table 1. Patient's demographic characteristics.

		N	%
Gender	Male	121	86.4
	Female	19	13.6
Education	Primary	19	13.6
	High school	57	40.7
	University	44	31.4
	MSc-Phd	20	14.3
Family status	Single	86	61.4
	Married/in relationship	29	20.7
	Homosexual	25	17.9
Occupation	Pensioner	22	15.7
	Employee	19	13.6
	Freelance	54	38,6
	Unemployed	45	32.1
Income	<500 €	45	32.1
	500 - 1500 €	83	59.3
	>1500 €	12	8.6
Country of origin	Greece	126	90.0
	Other	14	10.0
	Mean ± SD	Min	Max
Age	43.10 ± 11.96	20	69
Illness duration	9.00 ± 7.26	1	28

2.3. Translation

The "forward-backward" procedure was applied to translate the UCLA scale from English to Greek. The questionnaire was first translated into Greek by two independent translators whose native language was Greek. The translators were healthcare professsionals and familiar with the terminology. The instrument was then back translated into English by another two independent translators whose native language was English. Emphasis was given on conceptual and cultural equivalence in both ways of translation. The new back-translated version was then compared with the original version to check the validity of the translated version. The next step was comparison of the original and back translation questionnaire by the research team. Finally, a meeting of translators and the research team was held to make a decision about the final version.

3. Statistical Analysis

All the data were analysed using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA) and SAS version 7.0 (SAS Institute, Cary, NC, USA) statistical programs. The critical level for significance was chosen at $p < 0.05$.

Internal consistency of the UCLA was determined by calculating Cronbach (α) alpha coefficient (with $\alpha = 0.7$ indicating sufficient reliability).

The *validity* of the UCLA was conducted consisted of factor analysis, construct validity and the known group's validity.

Confirmatory factor analysis (*CFA*) was examined to confirm the factor structure as

suggested by the author of the original validation article. The *CFA* was analysed using the Analysis of Moment Structure (AMOS) version 7.0. For the rejection or acceptance of the model was based on global fit indices and magnitude of the variance explained by the resulting factors. The global fit indices included: The X^2-degrees of freedom (d. f) ratio < 2.0, RMSEA < 0:06, CFI > 0:90, NFI > 0:90, GFI > 0.85, AGFI > 0.85 indicated an acceptable fit.

Exploratory factor analysis (EFA) using principal component extraction method with Varimax rotation, was conducted to determine the factor structure of the items of the instrument (items with factor loadings ≥40 were retained).

Construct validity of the UCLA was determined by establishing its correlation to the HAD anxiety and depression scales.

Known groups validity of the instrument was examined in terms of the ability of the scale to discriminate between a group of people with a particular trait and the group without the trait. For the current analysis UCLA was assessed in order to reveal the ability of its scales to distinguish between subgroups of people concerning illness duration.

The reliability includes internal consistency reliability and test-retest reliability. Test-retest reliability (stability) indicates the stability of peoples' response in time and it was determined by calculating ICC. To assess test-retest reliability, we selected randomly 40 people for the second measure 7 days after the initial assessment.

4. Results

4.1. Descriptive Analysis

From our sample, 121 were males and 19 females. Descriptive statistics showed that the mean total score for UCLA was 42.59 (±11.03). For the factor 1, the mean score was 20.08 (±6.01), for factor 2: x = 10.66 ± 3.69 and for factor 3 the mean score was 9.24 (±3.01) (Table 2).

Confirmatory factor analysis (CFA): the one-factor model was conducted by confirmatory factor analysis giving unacceptable global fit indices. The resulting global fit indices $X^2 = 113.23$, $p < 0.0005$, chi-square-degrees of freedom (d. f.) ratio = 2.45, RMSEA = 0.102, CFI = 0.72, NFI = 0.68, GFI = 0.59, AGFI = 0.57 showed that the one factor solution proposed by the author should be rejected.

Table 2. Descriptive statistics of questionnaires.

	Mean	SD	Min	Max
Social loneliness	20.08	6.01	9.00	35.00
Psychological loneliness	10.66	3.69	5.00	20.00
Isolation	9.24	3.01	5.00	16.00
Total score	42.59	11.03	21	67
HAD anxiety	7.83	4.31	1.00	17.00
HAD depression	3.88	3.16	.00	13.00

Exploratory factor analysis: Using a minimum eigenvalue of 1.0 as the extraction criterion for factors, 3 factors were extracted. Factor 1 explained 41.9% of the total variance, Factor 2, 9.7% and Factor 3 explained 7.5% of the total variance. Factor loadings were high, ranging for factor 1 from 0.54 to 0.8, for factor 2 from 0.63 to 0.86 and finally for factor 3 from 0.5 to 0.83 (Table 3).

Factor 1 was labeled as "social loneliness" including the following items: 2) How often do you feel that you lack companionship? 3. How often do you feel that there is no one you can turn to? 4. How often do you feel alone? 7. How often do you feel that you are no longer close to anyone? 8. How often do you feel that your interests and ideas are not shared by those around you? 11. How often do you feel left out? 12. How often do you feel that your relationship with others is not meaningful? 14. How often do you feel isolated? 18. How often do you feel that people are around you but not with you?

Factor 2 was labeled as "psychological loneliness" includes the following: 13. How often do you feel that no one really knows you well? 15. How often do you feel that you can found companionship when you want it? 16. How often do you feel that there are people who really understand you? 19. How often do you feel that there are people you can talk to? 20. How often do you feel that there are people you can turn to?

Table 3. Eigenvalues and variance explained.

Total Variance Explained						
Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.973	41.963	41.963	4.869	25.624	25.624
2	1.849	9.730	51.693	3.483	18.330	43.954
3	1.443	7.593	59.286	2.913	15.332	59.286
4	0.989	5.367	64.652			
5	0.948	4.990	69.642			
6	0.862	4.537	74.179			
7	0.668	3.515	77.694			
8	0.581	3.060	80.753			
9	0.513	2.701	83.454			
10	0.468	2.461	85.915			
11	0.438	2.306	88.221			
12	0.418	2.202	90.423			
13	0.394	2.076	92.499			
14	0.303	1.595	94.093			
15	0.282	1.482	95.576			
16	0.269	1.414	96.990			
17	0.231	1.214	98.204			
18	0.182	0.958	99.162			
19	0.159	0.838	100.000			

Extraction method: principal component analysis.

Factor 3 was labeled as "isolation" including items: 1. How often do you feel that you are "in tune" with the people around you? 5. How often do you feel part of a group of friends? 6. How often do you feel that you have a lot in common with the people around you? 9. How often do you feel outgoing and friendly? 10. How often do you feel close to people? (Table 4).

4.2. Reliability

4.2.1. Internal Consistency

In terms of internal consistency, Cronbach's alpha for social loneliness was 0.898, for psychological loneliness: 0.870 and for isolation: 0.767. Corrected item subscales were greater than 0.3 ranging from 0.5 to 0.85 indicating strong relationship between individual items and total score (Table 5).

4.2.2. Test Retest Reliability

For the stability of the instrument test-retest analysis has been contacted of patients' responses. Forty patients were selected randomly from the sample completed the questionnaire 7 days after the baseline evaluation. Paired samples t test between baseline and follow up assessment yielded no statistically significant differences at two times period (Table 6).

Table 4. Exploratory factor analysis.

	Factors		
	1	2	3
ITEM2	0.807		
ITEM3	0.749		
ITEM4	0.744		
ITEM11	0.737		
ITEM12	0.688		
ITEM14	0.655		
ITEM7	0.600		
ITEM8	0.596		
ITEM18	0.546		
ITEM19		0.865	
ITEM20		0.754	
ITEM15		0.692	
ITEM16		0.675	
ITEM13		0.630	
ITEM9			0.838
ITEM10			0.785
ITEM5			0.644
ITEM1			0.581
ITEM6			0.500

Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization. Rotation converged in 5 iterations.

Table 5. Item subscale correlation.

	Factors		
	1	2	3
ITEM2	0.715		
ITEM3	0.787		
ITEM4	0.795		
ITEM11	0.775		
ITEM12	0.791		
ITEM14	0.742		
ITEM7	0.747		
ITEM8	0.658		
ITEM18	0.660		
ITEM19		0.828	
ITEM20		0.851	
ITEM15		0.820	
ITEM16		0.843	
ITEM13		0.719	
ITEM9			0.729
ITEM10			0.775
ITEM5			0.749
ITEM1			0.725
ITEM6			0.644

Table 6. Test-retest reliability.

	ICC (95%CI)	Paired samples t-test		
		Initial	Reassessment	*p*-value
Social loneliness	0.826 (0.69 - 0.90)	17.30 ± 4.27	18.20 ± 5.56	0.293
Psychological loneliness	0.980 (0.96 - 0.99)	10.33 ± 3.85	9.97 ± 3.81	0.101
Isolation	0.880 (0.75 - 0.94)	8.47 ± 2.08	9.13 ± 2.94	0.052

4.3. Validity

4.3.1. Construct Validity

HADs were used as a gold standard for UCLA to assess the construct validity of the instrument. Statistically significant correlations were found between *social loneliness* with HAD Anxiety (r = 0.382, $p < 0.005$), and HAD Depression (r = 0.431, $p < 0.005$). Additionally, statistically significant correlations were found between *psychological loneliness* with HAD Anxiety (r = 0.252, $p < 0.05$) and HAD Depression (r = 0.447, $p < 0.005$); similarly, the correlations between *isolation* with HAD Anxiety and HAD Depression were statistically significant (HAD-A, r = 0.244, $p < 0.05$, HAD-D, r = 0.413, $p < 0.01$).

4.3.2. Known Groups Validity

The UCLA results showed no differences in between sub-groups of patients (illness duration) considering the social loneliness. However, there are differences illness duration considering *psychological loneliness* and *isolation*. Significant mean differences in *psychological loneliness* were found between 1 year illness duration and more than 1

year illness duration (p = 0.01). Significant mean differences in *isolation* were found between 1 year illness duration (x = 7.96) and people with more than 1 year illness duration (p = 0.02) (Table 7).

5. Discussion

Loneliness is a complex experience that affects people with HIV as their social relationships might be deficient including the experience of isolation and disconnection [28]. Therefore, loneliness could be seen either as a temporary state due to specific changes such as moving to a new community or as a trait due to its duration (short or long-term loneliness). For this reason, loneliness assessment through validated measures has become a priority.

A survey that conducted in a region of China with high percent of people with HIV showed that 84.5% experienced moderate to high levels of loneliness. Social and family support had a negative correlation to loneliness. If people with HIV felt affection and have social support, the negative impacts of loneliness in their psychosocial life could be decreased [25]. In 1993, Laryea & Gien investigated the role of diagnosis in psychosocial aspects of peoples' life, mostly on relationships. The people expressed feelings of loneliness, stigma, fear of social rejection, uncertainty for their health and they had problems in their relationships with family members and friends. It is worth noting the fact that they could not share these feelings with their family and friends [29].

The current study evaluated the validity and reliability of a Greek translation of the UCLA among people with HIV receiving antiretroviral treatment. The objective of the UCLA was to facilitate the communication of loneliness between people with HIV and health care professionals, and also to supply the appropriate treatment to the patients.

The Greek UCLA was well accepted by patients as questions were asked in a simple and clear manner. The length of time (10 - 15 min) for the completion of the questionnaire also was acceptable. In addition, compliance was high, and there were no missing values. It was found to be an easy and usable instrument without special clinician training. Similarly, the psychometric properties presented, support the validity and the reliability of the instrument.

Confirmatory factor analysis of the UCLA Loneliness Scale suggested 3 factors: one single bipolar global loneliness factor and two orthogonal method factors (one for the positive items and another for the negative items) [20]. Three factor-analytic results

Table 7. Known groups validity.

	Illness duration	N	Mean ± SD	p-value
Social loneliness	1 year	24	19.54 ± 4.69	0.633
	More than 1 year	116	20.19 ± 6.26	
Psychological loneliness	1 year	24	8.87 ± 2.96	0.01
	More than 1 year	116	11.03 ± 3.72	
Isolation	1 year	24	7.96 ± 2.29	0.02
	More than 1 year	116	9.45 ± 3.04	

seem to differ from analyses that conducted in earlier versions of the UCLA Loneliness Scale. The validity issue addressed by these analyses concerned the factor structure of the Greek UCLA Loneliness scale (version 3). In order to evaluate the factor structure an exploratory factor analysis was conducted. A model that hypothesized three factors found to provide an excellent fit to the data and the factor analytic results are in agreement with analyses conducted in other researches using UCLA loneliness Scale. For example, Austin (1983) suggested a three factors analysis: factor 1 concludes all the negatively worded items and the other two factors conclude all the positively worded items [30].

Contrary to our findings different structure was obtained from other researchers. Knight and colleagues [31] and Miller and Cleary [32] presented a two factor structure analysis: one for lonely, negative items and one for non-lonely, positive items. In addition, Mahon [23] used an orthogonal varimax rotation and the two-factor solution was finally explored. Russel (1982) suggested the unidimensionality of the scale consistent to the Danish version of UCLA [33].

The Greek UCLA loneliness Scale discriminated well between subgroups of patients regarding the illness duration. People with HIV found to have higher loneliness and isolation than those with recent diagnosis probably due to the fact that people are feeling lonelier as the time goes by. Regarding the construct validity the three factors revealed low correlation with anxiety subscale and moderate correlation with depression subscale, confirming the strong association of UCLA with depression suggesting depression as the most consistently variable in loneliness.

The study also confirmed stability of the UCLA for a short time interval of 1 week as well as internal consistency. For the total score of Greek UCLA the results showed a high satisfactory and adequate psychometrically Cronbach's α coefficient of 0.91, which is comparable to alphas reported in previous studies ranging from 0.89 to 0.97. Correlation between items and subscales also were high further supporting internal consistency of the scale.

The current study enriches the variety of populations in studies that UCLA loneliness scale has been used. One limitation of the current study is the small sample size. People with HIV that are treated in Special Infection Units have been asked to participate (as target group) in a plethora of studies researching HIV aspects, so they tend to be tired and deny the participation. Additionally, another limitation of the current study is that women are under-represented. However, the psychometric data presented here supported the reliability and validity of the Greek UCLA loneliness Scale (version 3).

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