Health literacy scale-European union-Q16: a validity and reliability study in Turkey

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Abstract

The aim of this study was to determine of validity and reliability for Health Literacy Scale-European Union-Q16 (HLS-EU-Q16) in Turkish form. A methodological study was realized among adults in Turkey. HLS-EU-Q16 includes a total 16 questions and 3 sub-domains. Confirmatory factor analysis was performed to assess the construct validity of the Scale. Cronbach alpha was calculated. The item-total correlation coefficients and Lower-Upper 27% groups were used to calculate item discriminant indices. The study group was formed of 180 adults. After confirmatory factor analysis, it was assumed that the fit indices obtained were within the acceptable limits. The Cronbach alpha coefficient was ≥0.70. All items were found to be distinctive. This study showed that HLS-EU-Q16 is a valid and reliable measurement tool for assessing health literacy in Turkey.

Keywords: HLS-EU-Q16, validity, reliability, Turkey, health literacy.

Introduction

In the current health policies' and scientific developments, the share of patients in medical decision and treatment planning has increased. Additionally, health professionals need to present information about their patients' diseases better[1]. For patients, having adequate health knowledge develops their health status with cause of understand of diseases. Technological developments have facilitated access to health information. In order for the health information obtained to be used effectively, the Health Literacy (HL) levels of the individuals should be adequate[2]. Health Literacy can be define as "cognitive and social skills related to the ability of individuals to access, understand, and use health information and to develop and maintain health status"[3]. HL includes areas of health care, disease prevention and health promotion[4]. HL also plays an important role in increasing the level of social welfare and in decreasing of health inequalities. HL is closely associated with the use of health services, the attainment of health-related behaviors, the health outcomes and the social determinants of health[2,5,6].

In variously studies, when HL levels were inadequate, the following results were reported: Hospitalization rates and emergency department visits were higher. Adherence to drug treatment was insufficient. Participation in preventive health services such as immunization and cancer screening was low. Participation rate of health education programs was insufficiently.

Especially in chronic diseases such as cardiovascular diseases mortality was higher. They could not benefit from health services adequately[7-10].

Different terms are used in literature to describe HL level. Also terms may differ depending on the measurement tools used in the research.

Paasche-Orlow et al.[11] wrote a review in the United States between from 1963 to 2004 on HL-related researches. They found that the prevalence of low HL levels ranged from 0% to 68%. In addition, the weighted prevalence of low HL levels was reported to be 26% (95% CI: 22% -29%). Sørensen et al.[12] conducted a study covering 8 European countries (Austria, Poland, Greece, Spain, Germany, the Netherlands, Bulgaria and Ireland). According to their study, the prevalence of limited (inadequate or problematic) HL ranged from 29% to 62% among countries. Studies to determine the HL level in Turkey are limited. An example from Turkey: Durusu Tanrıöver et al.[13] conducted a study that represented Turkey. They used two different measuring tools. According to the first scale; the prevalence of adequate HL level was 30%. According to the second scale, adequate HL level prevalence was reported as 27.8% and excellent HL level prevalence as 7.6%.

When we look at the literature, we have seen that the HL scales' questions have not compliance to the Turkish health system, generally. The study required for the implementation of HL scales in Turkish society has been limited. In Turkey, a generally accepted and practiced means of measurement has not been occurred, yet.

In our study, we aimed to realize a study of validity and reliability for HLS-EU-Q16, which covers the three sub-domain of HL (health care, disease prevention and health promotion), in Turkey.

Materials and methods

Study Type: This is a methodological study.

Study period and area: The study was realized among adults who visit Family Health Centers (FHC) in Eskisehir city center, between from 1st to 30th October 2017. Eskisehir is a developed city of western Turkey.

Study group: According to the statistics of the Turkish Statistical Institute in 2016, the population of Eskisehir province was 844.842. Of the total population 49.9% (n: 421.580) consisted of men. The literacy rate was 98% for men and 95% for women. Eskisehir was in the 7th rank in Turkey in terms of socioeconomic development[14,15].

There are different views on determining the number of people to be reached in validity-reliability studies. One of the accepted approaches is that the number of people is 5-10 times the number of items in the scale[16].

While the number of participants was determined, it was also taken into account that such as refuse the study and can not to be evaluate the questionnaire form. Thus, the number of participant calculated was increased by 10%. Study group was formed with 180 participants. They were 18 and upper aged adults.

There are two districts in the city center of Eskisehir. These are: Odunpazari and Tepebasi. There are 55 FMCs in the city center of Eskisehir (29 in Odunpazari and 26 in Tepebasi)[17]. Six FHCs selected randomly. These: Batikent, Camlica, FevziCakmak, Vadisehir, Emek, and Kemal Nurhan Mani. During the study period, the data of 180 participants who applied to select FHCs and accepted to the study were evaluated.

Questionnaire form: In this study, as a data collection tool, a questionnaire consisting of 2 parts was prepared by taking advantage of the literature[5,12,13,18]. Part 1 of the questionnaire inquires some sociodemographic characteristics of the persons (age, education status, working status, family type, and family income status). Part 2 contains the questions of HLS-EU-Q16.

With a pilot study, questionnaire form was tested in terms of intelligibility among 20 people who applied to FHC. Participants were informed about the subject of this study. The questionnaire forms were filled with the self-report method, under observation. This process took approximately 15-20 minutes, for each one.

The HLS-EU was developed within the framework of the *European Health Literacy Project* from 2009-2012. There are three forms: HLS-EU-Q86, HLS-EU-Q47 and HLS-EU-Q16[12]. DurusuTanrıover et al.[13] was realized a study of validity and reliability study for HLS-EU-Q47 in Turkey. The HLS-EU-Q16 form was created with 16 selected questions of HLS-EU-Q47 (This scale includes 47 questions). But there is no validity and reliability study for HLS-EU-Q16 in Turkey, yet.

In the study, HL level of participants was determined by HLS-EU-Q16.

The scale consists of 16 questions. There are three sub-domains as follows: "Health Care (HC)", "Disease Prevention (DP)", "Health Promotion (HP)".

The standardized index score is used to calculate the total score (Index = (average[a]-1)*(50/3)). The index score ranges from 0 to 50. As the score on the Scale increases, the HL level increases[12,13].

Validity-Reliability analyses: Opinions of five Public Health specialists and a Measurement-Evaluation expert were taken to assess the validity of the HLS-EU-Q16 content. Experts are required to evaluate each item on the scale as "necessary and sufficient," "necessary but should made revised", "unnecessary or should made completely revised". The required revisions towards the opinion of the experts were made, without detracting from the main structure of the item. Later, expert opinions were transformed into statistically interpretable. For each item, the *content validity ratios*(CVR) were calculated using the following formula: "[The number of experts reporting "necessary and sufficient" / half of total number of experts] -1". Items with "0 or negative" CVR are subtracted from the scale.

In our study, "0 or negative" CVR was not found, for any item. Later, *content validity index* (CVI) were calculated with averages of CVRs[19].

The confirmatory factor analysis (CFA) was used to evaluate the construct validity of HLS-EU-Q16.

As a result of CFA; Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Error (SRMR), Comparative Fit Index (CFI), Goodness of fit Index (GFI) and AGFI Adjusted Goodness of fit Index (AGFI) were calculated.

For the internal consistency of HLS-EU-Q16, the Cronbach alpha coefficient was calculated.

Item analysis were carried out using the "item-total correlation coefficients" and "comparison of item scores for lower 27% and upper 27% groups".

Permits: In order to be able to use HLS-EU-Q16, permission was obtained by e-mail from European Health Literacy Project coordinator Sorensen[12].

Due to the fact that the original version of HLS-EU-Q16 is in English, permission for use of the scale was obtained from researchers who conducted the validity-reliability study of HLS-EU-Q47 in Turkey. In order to no repeat the linguistic translation processes, it was contacted by Yildirim[13].

For this study, Eskisehir Osmangazi University Medical Faculty Non-Interventional Clinical Research Ethics Committee was approved.

Written permission has been obtained from Eskisehir Provincial Public Health Directorate. Verbal advices of participants were requested.

Compliance to Helsinki Declaration Principles was considered.

Statistical Analysis: Statistical analyses were determined on IBM - SPSS (version 20.0). Mann Whitney U was used for comparison of item scores between 27% upper group and 27% lower group. Comparisons of three or more averages were made with the Kruskal Wallis test. For statistical significance, p<0.05 values was accepted.

Results and discussion

Validity-Reliability Findings: In our study, CVI was found as 0.86.

Fit indices of the measurement model for HLS-EU-Q16 were presented in Table-1.

Table-1: Fit indices of the measurement model for HLS-EU-Q16.

Compliance criteria	Fit indices
X^2/d	2.19
RMSEA	0.08
SRMR	0.07
CFI	0.84
GFI	0.87
AGFI	0.82

The measurement model revealed for HLS-EU-Q16 was presented in Figure-1.

Cronbach alpha coefficients for HLS-EU-Q16 internal consistency were as follows: 0.82 for HC sub-domain, 0.77 for DP sub-domain, 0.70 for HP sub-domain, and 0.89 for HLS-EU-Q16 overall. The Cronbach alpha coefficient was not increased when any item was removed from the HLS-EU-Q16 scale.

The item-total correlation coefficient for each item on the HLS-EU-Q16 scale ranges from 0.34 to 0.64. For each item in HLS-EU-Q16, the item-total correlation coefficient and the Cronbach's alpha coefficient when the item is omitted were presented in Table-2.

In the study, the median scores from the overall HLS-EU-Q16 scale and the subscales of the 27% upper group were higher than the 27% lower group (p <0.05 for each one).

Distribution of the scores of the subjects in the 27% upper group and 27% lower group from the overall scale and sub-domains of the HLS-EU-Q16 was presented in Table-3.

Findings about the characteristics of the study group: The average age of the study group was 40.36±13.65 years (min: 18; max: 75). Of the study group, 52.2% (n = 94) were women and nearly half (47.2%) had middle school and lower education level.

HLS-EU-Q16 overall scores were lower in men and in participants who have the secondary school and lower educational level (p<0.05 for each one).

Distribution of the HLS-EU-Q16 overall scale scores of the study group according to some socio-demographic characteristics was presented in Table-4.

Discussion: Sufficient level of HL is important issue in terms of effective use of health services, and to make decisions that improve the health of both the individual and the community, and to move towards healthy lifestyle behaviors[20]. The determination of the level of HL of the community sheds light on the intervention studies related to this topic and is guided by health planning.

Therefore, measurement instruments with validity and reliability are needed in HL. For these reasons, we considered that important of the evaluating the validity and reliability of HLS-EU-Q16. We can interpret the compliance criterion we obtained in CFA for HLS-EU-Q16 construct validity as follows: RMSEA and SRMR were smaller than 0.1. X2 / d value was smaller than 5. The other fit indices were higher than 0.80. These results indicate that the all fit indicesare within acceptable limits. The 3-factor model presented for HLS-EU-Q16 shows that it is compatible with the obtained data[21].

There was no validity-reliability study for HLS-EU-Q16 in the literature. But there were studies for HLS-EU-Q47. In comparison with our results, similar fit indicesfor HLS-EU-Q47 have been reported for validity-reliability studies in different countries[22,23].

For a reliable scale, the Cronbach's alpha coefficient should be ≥ 0.70. For HLS-EU-Q16, the Cronbach alpha coefficient was found to be ≥0.70 in both the scale overall and its sub-domains. These results show that the items of HLS-EU-Q16 are consistent with each other[24]. In the original study of HLS-EU-Q47, the Cronbach alpha coefficient was reported to be >0.90 in all sub-domains and scale overall. In the HLS-EU-Q47 adaptation studies conducted by different researchers in Turkey, it has been reported that the Cronbach's alpha coefficient was > 0.85 for both each sub-domain and the scale overall[12,13,25].

The reasons for reporting different outcomes in studies may be that the sample size or number of the items in the scale are different[26].

Table-2: For each item in HLS-EU-Q16, the item-total correlation coefficient and the Cronbach's alpha coefficient when the item is omitted

	1*	2**
Health care sub-domain		
1. To find information about the treatment of your own diseases	0.542	0.878
2. Get information about where you will get professional help when you are sick *(referral: doctor, pharmacist, psychologist etc.)*	0.599	0.876
3. To understand what your doctor tells you	0.493	0.880
4. To understand how your doctor or pharmacist directives how to use a prescribed medicine	0.512	0.880
5. To evaluate when it may be necessary to get a second doctor's opinion	0.483	0.881
6. Using your doctor's information to make decisions about your illness	0.555	0.878
7. Fulfill the instructions of your doctor or pharmacist	0.508	0.880
Cronbach alpha coefficient	*0.82*	
Disease prevention sub-domain		
8. To find information about the treatment of mental health problems such as stress and depression	0.499	0.881
9. Be aware of health warnings about behaviors such as smoking, low physical activity and excessive alcohol intake	0.577	0.877
10. To understand why you need health screening (*Referral: Breast examination, blood sugar test, blood pressure*)	0.623	0.875
11. To assess the accuracy of the information on health risks in the media(*Referral: TV, internet or other media*)	0.491	0.881
12. To decide how to protect himself/herself from illnesses according to the information in the media (*Referral: newspapers, brochures, internet or other media*)	0.559	0.878
Cronbach alpha coefficient	*0.77*	
Helth promotion sub-domain		
13. Access to information about activities that are good for mental health (*Referral: exercise, walking, pilates, etc.*)	0.624	0.875
14. To understand the advice of the family or friends about health	0.499	0.880
15. To understand the information about being healthier on the media (*Referral: internet, newspapers, magazines*)	0.588	0.876
16. To assess which of the daily behaviors are health related (*Referral: Eating and drinking habits, exercise, etc.*)	0.509	0.879
Cronbach alpha coefficient	*0.70*	
HLS-EU-Q16 overall Cronbach alpha coefficient	*0.89*	
* Item total correlation coefficient, ** When the item is omitted, the Cronbach alpha coefficient		

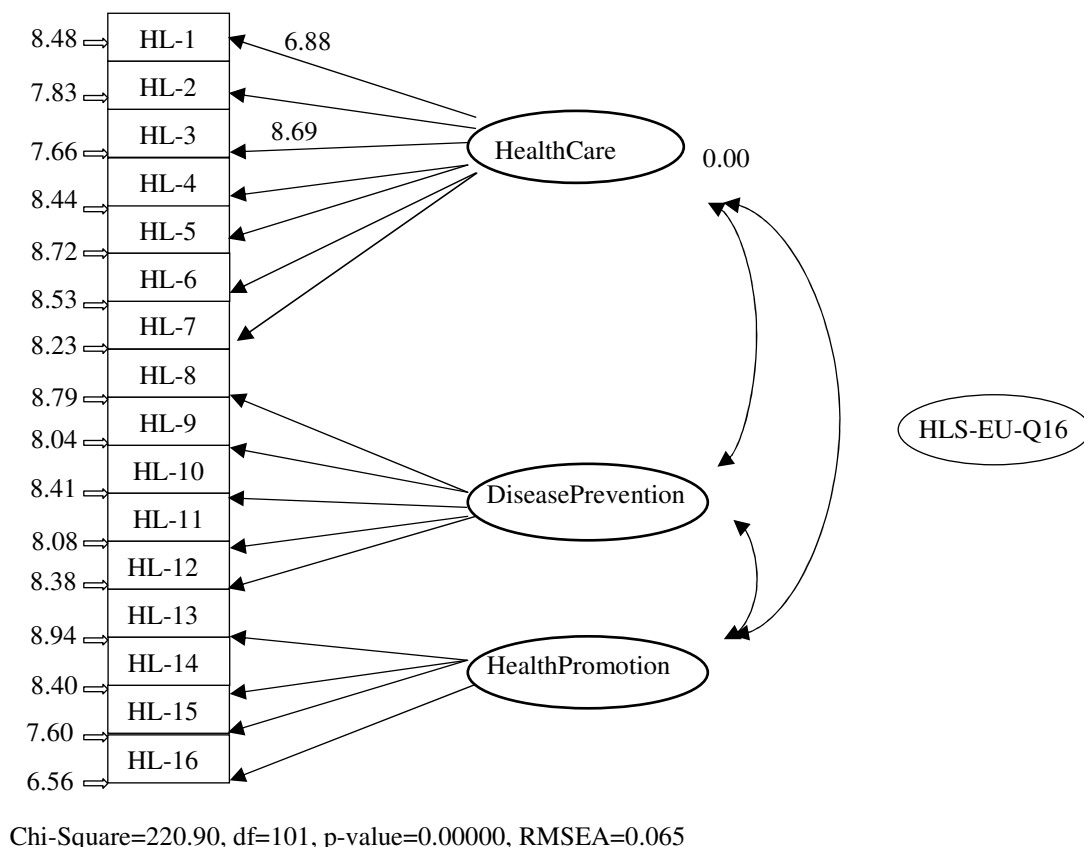Chi-Square=220.90, df=101, p-value=0.00000, RMSEA=0.065

Figure 1. Measurement model revealed for HLS-EU-Q16.

Table-3: Distribution of the scores of the subjects in the 27% upper group and 27% lower group from the overall scale and sub-domains of the HLS-EU-Q16.

HLS-EU-Q16	27% lower group score Median (Min-Maks.)	27% upper group score Median (Min-Maks.)	Test values z; p
Health care	28.6 (7.1-33.3)	45.2 (38.1-50.0)	9.489; 0.000
Disease prevention	23.3 (13.3-26.7)	40.0 (33.3-50.0)	9.497; 0.000
Health promotion	29.2 (0.0-33.3)	39.6 (33.3-50.0)	8.896; 0.000
HLS-EU-Q16 scale overall	27.9 (7.8-30.2)	41.7 (36.5-50.0)	9.460; 0.000

In the study, item-total correlation coefficients, which are one of the reliability analyzes and considered as a sign of item discrimination, were examined. It is desirable that this coefficient is ≥ 0.30 for distinguishing between the person who knows and person who does not know[27]. For HLS-EU-Q16 it was seen that the discrimination coefficients of all items were sufficient. Similar results have been reported for the HLS-EU-Q47 in Turkey Healthy Literacy Scale Study[25]. Another analysis for item discrimination showed that the 27% upper group scores were higher than the 27% lower groups ($p <0.05$). This means that item discrimination is sufficient.

In our study, educational level and scores from HLS-EU-Q16 were compared for predictable validity. Because of HL is related to cognitive skills such as acquiring knowledge, understanding of knowledge, and interpretation of information, it is hoped that the level of HL is higher in those with higher educational level. The findings of this study confirmed our expectation. For those with secondary and lower education levels, the HLS-EU-Q16 total scores were lower ($p<0.05$). Similarly, some studies reported that HL levels were higher in people with higher levels of education[13,22,25].

Table-4: Distribution of the HLS-EU-Q16 overall scale scores of the study group according to some socio demographic characteristics.

Socio demographic characteristics		n (%)	HLS-EU-Q16 total score Median (Min.-Maks.)	Statistic analyses z/KW; p
Age group (years)	<40	90 (50.0)	33.3 (19.8-50.0)	5.589; 0.061
	40-59	72 (40.0)	33.3 (19.8-50.0)	
	≥60	18 (10.0)	29.5 (7.8-40.6)	
Gender	Women	94 (52.2)	33.3 (7.8-50.0)	2.349; 0.019
	Men	86 (47.8)	32.3 (19.8-50.0)	
Educational level	≤Secondary school	85 (47.2)	32.1 (7.8-50.0)	12.507; 0.002
	Collage	54 (30.0)	33.9 (20.0-50.0)	
	University	41 (22.8)	34.4 (25.0-50.0)	
Family income	Low	12 (6.7)	33.3 (7.8-40.0)	3.396; 0.183
	Middle	136 (75.6)	32.3 (19.8-50.0)	
	High	32 (17.8)	34.4 (19.8-50.0)	
Total		180 (100.0)	33.3 (7.8-50.0)	

Conclusion

As a result, HLS-EU-Q16 was a valid and reliable measurement tool for evaluating HL level in Turkey. But it needs to be tested and developed in different study groups.

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