Original Article

Validity and Reliability of Iranian Version of eHealth Literacy Scale

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Received: 2016/03/05 **Accepted:** 2016/05/14

Abstract

Introduction: eHEALS is an 8-item measure of eHealth literacy developed to measure consumers' combined knowledge, comfort, and perceived skills at finding, evaluating, and applying electronic health information to the health problems. Hence, the current study aimed to measure validity and reliability of the Iranian version of eHEALS questionnaire in a population context.

Materials & Methods: This cross-sectional study was conducted on 525 youth's people, who were randomly chosen in Iran, Yazd. As a matter of fact, content validity, construct validity and predictive validity of the translated questionnaire were determined. Principal components factor analysis was used to determine the theoretical fit of the measures with the data. The internal consistency of the translated questionnaire was evaluated using Cronbach α coefficient and the results were analyzed applying SPSS software (ver, 16)**.**

Results: The principal component analysis (PCA) produced a single factor solution (70.48% of variance) with factor loading ranging from 0.723 to 0.862. The internal consistency of the scale was sufficient (alpha= 0.88 , P<0.001) and the test-retest coefficients for the items were reliable (r= 0.96, P<0.001).

Conclusion: The results of the current study revealed that the items in the translated questionnaire were equivalent to the original scale .The Iranian version of the eHEALS questionnaire showed a good reliability and validity in regard with the screening of eHealth literacy of Iranian people.

Key words: eHealth Literacy; eHEALS questionnaire; Reliability; Validity

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Introduction

Every day, people deal with a large amount of informationwhichinterfereswith making decision for their health. Health literacy is a key element demonstrating how people should use this information. It is estimated that more than 113 million American obtain health information from 70000 health related websites annually[1], most of whom edo not have enough capability to use such health information[2]. Therefore, electronic health tools provide little value if the intended users lack the skills to get engage with them effectively.

Health People 2010; the report of department of Health and Human Services; defines health literacy as the degree to which individuals have the capacity to obtain, process and understand basic health information[3]. Today, due to the rapid use of internet as a source of health information, ehealth literacy has become an important issue to be taken into account. Indeed, ehealth is the use of emerging information and communication technology, specifically the internet to promote health or health care [4]. Ehealth literacy is defined as the ability to search, find, understand and appraise health information from electronic sources and apply them to solve a problem [4]. The eHealth Literacy Scale (eHEALS) was designed (A) to assess consumers' perceived skills at using information technology for health and (B) to aid in determining the fit between eHealth programs and consumers. In fact, itcomprises of six skills: traditional literacy, health literacy, information literacy, scientific literacy, media literacy and computer literacy [4].

The eHEALS involves an eight-item self-reported measure of perceived eHealth literacy. Participants indicate their level of agreement with eHealth statements on a five-point Likert type scale (1 = strongly disagree, 5 = strongly agree). Score totals range from 8 to 40. In other words, higher scores reflect higher perceived levels of eHealth literacy [5]. The findings of some studies revealed that low eHealth literacy is associated with less knowledge of diseases like colorectal cancerand chronic diseases [6-9].Previous studies have reported thatinternet users with high eHealth literacy are more likely to have knowledge compared to those with low health literacy[6]. Overall, eHealth promotes efficiency in health services, reduces costs and improves quality by the comparison made between various health sectors.[6] Today, countries have built new IT systems allowing doctors and health care providers to get secure, accurate and comprehensive information of patients quickly and efficiently, thereby saving valuable time and money.

Findings of a studycarried out in Iran revealed that patientshada tendency to use IT technology[10], though no valid information has been observed regarding the level of eHealth literacy among Iranian population. Since there exists no validated Persian language tool to assess ehealth literacy in Iran and other Persian language speaking countries, the present this study aimed to measure validity

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and reliability of an Iranian version of eHEALS questionnaire in a population context.

Materials and Methods

In this cross sectional study, TOFHLA, REALM and Newest Vital Sign (NVS) can be mentioned as three key tools to assess the health literacy through measuring reading ability and comprehension test. The eHEALS questionnaire is a self-report Likert-scaled questionnaire consisting of 8 questions related to finding, assessing and using health information on the internet.

This study comprises as a part of a big project aiming to assess the relationship between ehealth literacy and health behavior in adults. To assess the validity, e-health literacy questionnaire was filled out by 525 students, who were randomly selected in Shahid Sadoughi University of Medical Sciences. Furthermore,to evaluate the reliability30 individuals were required to fill it out two times in a few week interval. The length of the test-retest was long enough for subjects to forget their response to the questions inthe pre-test phase.

The second questionnaire consisted of 10 questions to evaluate theparticipants' skills in regard withuse ofcomputer and internet. In fact, the computer literacy of participants was assessed by determining participants' knowledge with respect to computer, internet and how they use different strategies to search information on the internet.

Validity

Validity and reliability of the questionnaire were assessed using SPSS software (version 16). To approve validity of theIranian version of the questionnaire, content validity, construct validity and criterion validity of the questionnaire wereexamined. Measuring content validity is of great importance if the questions are understandable and fluent for individuals. To this purpose, the questionnaire was given to relevant specialists as well as some subjects who were interviewed. At the end, they were demanded to update terms and clarify the confusing items.

Construct validity of the questionnaire can be stated as that aspect reflecting the correlation between the questions and the underlying theories[12]. This procedure was examined using principal component analysis, which the results were compared applying Comery and Lee's guidelines (1992). In fact, the guidelines state that factor loading above0.71 is considered excellent , 0.63 is reported very good and 0.55 is indicated good[13] Criterion-related validity refers to the degree to which a diagnosis or diagnostic criterion is linked to prospect outcomes.[14] In the present study, measuring the relationship between eHealth score and other variables in computer literacy questionnaire shows predictive validity of the questionnaire.

Reliability

Test to retest reliability was evaluated according to the Fleiss criteria where an ICC of <0.4 indicates poor, 0.4–0.75 fair-to-good, and >0.75 excellent reliability [15, 16]. In the current study, internal consistency was

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assessed using Cronbach alpha which was run on all items within a particular construct. In general , a Cronbach alpha of 0.7 to 0.8 is regarded as satisfactory for the scales to be used as research tools[16].

Results

In this study, 173 males and 379 females participated, of which61.5% had MSc degree, 34.2% had MA degree and 3.8% had Doctorate degree. Seventy eight percent of the subjects were reported to have permanent access to a computer and 63.7% had access to internet all the time.

Table1. Demographics of the participants

Variables	n=525
Gender	
Female	366
Male	169
Education	
Bachlor degree	329
MA degree	182
PhD degree	21

Content validity

The original version of the questionnaire was translated to Persian. To measure face validity of the translated questionnaire, it was reviewed by four experts in public health and medical informaticsfield. They were requiredto change incorrect or unambiguous terms as well as to add additional comments to the translated questions and afterreviewing, threeterms were changed. Finally, the modified questionnaire was administered to the pilot group(n=30) in the pre-test phase of reliability. They were asked to write their ideas about the questions, so asthe review of the results showed that they did not have any difficulty with the questions.

Construct validity

To assess the suitability of the data for factor analysis, Kaiser- Meyer-Olkin (KMO) measure of sampling adequacy and Bartelett's test of sphericity were administered. In statistics, Kaiser-Meyer-Olkin measures sampling adequacy and Bartlett's test were used to evaluate if k samples were from populations with equal variances [15].The study results revealed that the amount of data were suitable for factor analysis (KMO=0.89, P≤0.001). Factor analysis was used to determine the underlying themes using an eigenvalue>1, factoring in the two components. The first component contained two items and the second one included six items. Factor one contained 57.40% of variance and the other one contained 13.09% of the variance. In addition, varimax rotation

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revealed that eight items were loaded on the right factor (Table 2).

Table 2. Results of the principal component analysis of ehealth literacy questionnaire

Item	Component 1	Component 2
Q1.I know what health resources are available on the internet		.842
Q2.I know where to find helpful health resources on the internet		.862
Q3.I know how to find helpful information health resources on the internet	.680	
Q4.I know how to use the health information I find on the internet to help me	.723	
Q5.I know how to use the internet to answer my health questions	.753	
Q6.I have the skills I need to evaluate the health resources I find on the internet	.804	
Q7.I can tell high quality from low quality health resources on the internet	.803	
I f8. I feel confident in using information from the internet to make health decisions	.847	

However scree plot supported two factors with eigenvalue>1(fig 1)

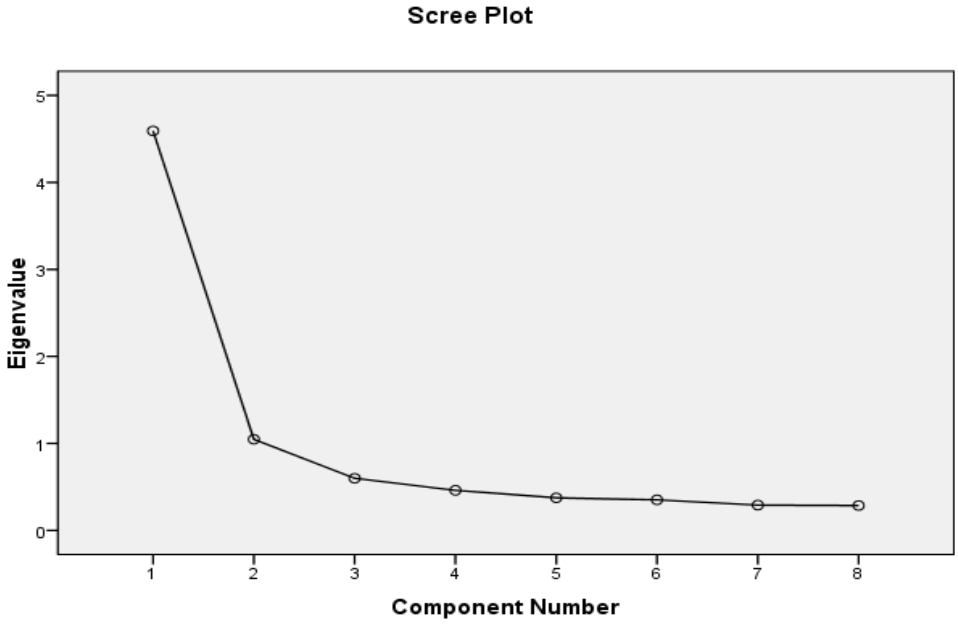

Figure 1 Scree plot for factor analysis of data

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Criterion-related Validity

In the present study, criterion validity was examined applying Pearson correlations between the measured constructs as well as computer literacy questionnaire.The results demonstrated an excellent criterion-related validity between the two measurements.($p \leq 0.001$)

Reliability

Target audience members (n=30) took the test at twodifferent intervals. The responses were correlated and compared via paired T-Test. All the questions met reliability criteria (r= 0.96, P=P<0.001), and the total Cronbach α for 8 items was equalto 0.886.

The value of intra-class correlation coefficients (ICCs) indicated moderate reproducibility (ICC=0.556, 95%CI=0.43-0.70, $p \leq 0.001$), that is to say if a subsequent observation is made, it will probably be similar to the original.

Discussion

The purpose of the current study was to translate the original English version of eHEALS questionnaire into Persian as well as to assess validity and reliability of Iranian version of eHealth literacy. Although Vaart[17] and Nahm [18] hesitate about the validity and reliability of the original version of the questionnaire, so for, the HEALS questionnaire is the only valid scale to measure eHealth literacy. Vaart suggested further studies to approve validity and reliability of the mentioned questionnaire. Nahmemphasized that the questionnaire may be an appropriate instrument to assess eHealth literacy of adults. It should be mentioned that the translation and validity tests of the questionnaire were conducted on the basis of recommended valid guide lines[19-21].

Consonant with prior studies, validity and reliability of eHEALS questionnaire, have been demonstrated to lie at [9, 19, 20] ahigh level of validity and reliability comparable to other translations of this tool. As a matter of fact, all items of the questionnaire showed a good consistency.Since exclusion of any item did not increase Cronbach alpha more than 0.02, all the eight items were considered in the translated questionnaire. According to Comery and Lee's guidelines, the Iranian version of eHealth literacy showed an excellent construct validity.

Consistent with findings of the previous studies (9,19-20), a positive weak-to-moderate correlation was detected between the eHealth scores and education, computer knowledge,internet knowledge and the use of Internet for health-related purposes and use of search strategies which is predictable The tool seemed to be unable to distinguish the differences between themales' and females' eHealth literacy. Thus, predictive validity of the questionnaire showed a moderate validity. Furthermore, the final version of Iranian version of eHEAL Squestionnaireis recommended to be revised in the future.

Limitations

The Iranian version of eHEALS questionnaire was validated within a youth population. Due

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to the rapid growth as well as use of technology by a wide range of groups, additional research seems to be required in order to examine the questionnaire applicability to the other populations like illiterateor old people.

Conclusion

The Iranian version of eHEALS literacy questionnaire was equivalent to the original version of this questionnaire in terms of validity and reliability. In the current study, only some aspects of the validity have been measured, therefore it is worthwhile to undertakefurther validity tests on this questionnairein the future.

Acknowledgement

We would like to thank all professionals and target groups giving feedback in regard withtesting the questionnaire.

Conflicts of Interest

The authors report no conflicts of interest

Funding

This study was funded by ShahidS adoughi University of Medical Sciences and Health Services.

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