

## Cross-cultural adaptation and psychometric evaluation of the Herth Hope Index (HHI) within a sample of Iranian older people

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## The International Journal of Aging and Human Development

### Cross-Cultural Adaptation and Psychometric Evaluation of the Herth Hope Index (HHI) within a Sample of Iranian Older Peoples

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Abstract:	<p>There is a need to understand better the measurement of hope within a variety of cross-cultural contexts and older population. The objective of this study was to examine the psychometric characteristics of the Persian translation of the Herth Hope Index (HHI-Persian). This study used a sample of 500 Iranian older people in Iran. Psychometric properties of the HHI-Persian were evaluated using face, content and construct validity. The construct validity of the instrument was tested using exploratory and confirmatory factor analysis. Reliability assessed is within the acceptable range. Construct validity of the scale showed two factors explaining 49.22 % of the variance. Internal consistency of 12 items were greater than .70. The HHI-Persian is a short, reliable, and valid assessment scale of hope in older people. The paper ends with suggestions for further research.</p>



**Cross-Cultural Adaptation and Psychometric Evaluation of the Herth Hope Index (HHI) within a Sample of Iranian Older Peoples**

**Abstract**

There is a need to understand better the measurement of hope within a variety of cross-cultural contexts and older population. The objective of this study was to examine the psychometric characteristics of the Persian translation of the Herth Hope Index (HHI-Persian). This study used a sample of 500 Iranian older people in Iran. Psychometric properties of the HHI-Persian were evaluated using face, content and construct validity. The construct validity of the instrument was tested using exploratory and confirmatory factor analysis. Reliability assessed is within the acceptable range. Construct validity of the scale showed two factors explaining 49.22 % of the variance. Internal consistency of 12 items were greater than .70. The HHI-Persian is a short, reliable, and valid assessment scale of hope in older people. The paper ends with suggestions for further research.

**Keywords**

Herth Hope Index, Psychometrics, Hope, Older People, Iran

## Introduction

Hope is important to the mental well-being of individuals (Soundy, Liles, Stubbs, & Roskell, 2014) as a protective mechanism against stress and illness and as a prerequisite for enabling effective coping (Phillips-Salimi, Haase, Kintner, Monahan, & Azzouz, 2007). It has a positive influence on negative psychological characteristics such as burn out and stress (Meyers, van Woerkom, & Bakker, 2013) and has shown to have a longitudinal effect on well-being (Ciarrochi, Parker, Kashdan, Heaven, & Barkus, 2015). Individuals with higher levels of hope are less isolated and have more positive interpersonal relationships (Coduti & Schoen, 2014). Hope also is positively associated with other psychological constructs such as self-esteem and life satisfaction (Yarcheski, Mahon, Yarcheski, & Cannella, 2004). Hope has a significant role to play in coping with illness and loss, whilst the loss of hope can create a succumbing response (Soundy & Condon, 2015). The birth of hope is particularly relevant in situations where health is threatened, in particular with individuals who are elderly (de Oliveira, Silva, Lima, Gomes, & Olympio, 2018).

There exists a variety of scales to measure hope, a multi-dimensional concept based on different conceptualisation (Herth, 1991; Snyder & Forsyth, 1991; Soundy et al., 2014). Some scales are not able to assess the multi-dimensional nature of hope (Schrack, Woppmann, Sibitz, & Lauber, 2011). The Herth Hope Index (HHI) (Herth, 1992) was refined from the Herth Hope Scale (HHS) (Herth, 1991). HHI was designed to allow a quick assessment of hope in diverse adult populations using three factors of hope: temporality and the future, interconnectedness, and readiness and expectancy (Herth, 1992). In recent years there have been a number of researchers who have validated the HHI (e.g., (Benzein & Berg, 2003; Herth, 1992; Phillips-Salimi et al., 2007) and it has been adapted and translated into different languages e.g., Portuguese, Dutch,

German, and Japanese (Geiser et al., 2015; Hirano, Sakita, Yamazaki, Kawai, & Sato, 2007; Van Gestel-Timmermans, Van Den Bogaard, Brouwers, Herth, & Van Nieuwenhuizen, 2010) as well as the Farsi language (Abdi & Lari, 2011).

It should be noted that there is a need to better understand hope within a variety of cross-cultural contexts and different population (Ripamonti et al., 2012). Translation of scales need to be culturally sensitive and psychometrically sound in order to generate valid and generalizable research findings (Sartorius & Kuyken, 1994; Waltz, Strickland, & Lenz, 2017). Researchers cautioned when considering the utilisation of the scale across cultures (and languages) and populations (Chan, Li, Chan, & Lopez, 2012). The main problems identified during validation of the HHI has been two items (item 4 ‘I can see a light in a tunnel’ and item 5 ‘I have faith that gives me comfort in the scale’) (Benzein & Berg, 2003; Chan et al., 2012; Van Gestel-Timmermans et al., 2010). In addition, past studies have not been able to replicate the 3-factor model (Geiser et al., 2015; Koizumi, Ito, Mori, & Miyamoto, 1999). Further to this the utilisation of the total score rather than sub-totals should be considered (Geiser et al., 2015). Although past research in Iran has attempted a translation of the HHI into Persian language (Abdi & Lari, 2011), the target population were the younger age groups between the ages of 17-43 years, whereas most other studies utilise an older age group (Chan et al., 2012; Koizumi et al., 1999). In addition, research by Abdi and Lari (2011) reported basic correlations without testing the validity of the translated scale. Therefore, this study examined the psychometric properties of HHI-Persian using a more rigorous validation process. In addition, since the population of Iran is ageing (Danial, Motamedi, Mirhashemi, Kazemi, & Mirhashemi, 2014) and since hope has a positive effect on coping and emotions (Folkman, 2013), this study tested the psychometric properties of HHI-Persian among healthy older adults.

It is significant to recognize the relation between the hope aspect and mental health recovery. The HHI appeared to be a good instrument for this purpose as it is a brief instrument with good psychometric properties developed for clinical usage. It is to enable the examination of hope at numerous intervals and to identify and detect changes in levels of hope. Moreover, its validity and reliability has been well-established in different languages (i.e. Portuguese, Dutch, German, and Japanese) (Van Gestel-Timmermans et al., 2010). To the best of the authors' knowledge criterion related validity of the HHI in people living in Iran has not been established using exploratory factor analysis and confirmatory factor analysis among older people population. Thus, the main purpose of the present study is to test the psychometric properties of HHI-Persian Index, which addresses the shortcoming the previous study of HHI in Iran that failed to test the validity of the translated scale. In addition, since the population of Iran is ageing (Danial et al., 2014) and since hope has a positive effect on coping and emotions (Folkman, 2013), it is imperative to examine hope orientation among the older people population in Iran. This will be useful for health practitioners when addressing the emotional health of older people.

## Methods

### *Data source*

Data collection took place in 23 clinics by two researchers from December 2015 to April 2016 in Qazvin, Iran on older adults who visited the clinics for controlling their blood pressure and receiving some educational information. The inclusion criteria included: 1) willingness to participate in research; 2) age 60 and over; 3) being aware of time and place; 4) having ability to communicate; and 5) ability to respond to the questionnaire. The survey excluded people who experienced extreme stress in the former month. A convenience sample of 504 older adults participated in the study.

**Measures**

The questionnaire consisted of two parts: 1) Basic questions eliciting demographic information; and 2) Herth Hope Index (HHI).

*Herth Hope Index (HHI):* The HHI is a 12-item abbreviated version of the Herth Hope Scale (HHS) (a 30-items scale) measuring multidimensional aspects of hope based upon Dufault and Martocchio’s (1985) conceptual framework of hope. It uses a 4-point Likert scale to access a participant’s level of hope. Total HHI score can range from 12 to 48 with higher scores corresponding to higher levels of hope (Herth, 1992). The HHI is widely used on individuals experiencing varied health conditions in both hospital and community settings. The validity and the reliability of HHI have been well established in different studies (Benzein & Berg, 2003; Chan et al., 2012; Herth, 1992).

**Procedure**

Written permission for the use of the HHI was obtained from the developer of the scale, Dr. Kaye Herth. The World Health Organization protocol of forward-backward translation technique was used for translating the scale from English into Persian (World Health Organization, 2016). Two English-Persian translators independently translated the HHI. An expert panel, consisting of three papers’ authors as well as two professional translators, assessed and unified the two translations and constructed a single Persian translation of HHI. Thereafter, a Persian-English translator was asked to back-translate the Persian HHI into English. This English version of the HHI was sent to Dr. Herth, for confirmation of the correctness of translations and confirming the similarity of the achieved English HHI with its original.

**Psychometric Properties of the HHI-Persian Version**

**1. Content validity**

*Qualitative content validity:* Content validity of the HHI was assessed using feedback from fifteen specialists currently working with older people. This group comprised seven psychiatrists, three clinical psychologists, and five psychiatric nurses. The group of specialists assessed the wording of the HHI and provide general feedback regarding item allocation and the scaling of items (Colton & Covert, 2007).

## *2. Construct validity*

Construct validity was evaluated through Maximum Likelihood Exploratory Factor Analysis (MLEFA) with Promax rotation on the first set of 252 responses. The Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity were used to check the appropriateness of the study sample and the model. The number of factors was determined based on Horn's Parallel Analysis (Çokluk & Koçak, 2016). Items with absolute loading values of .4 or greater were considered appropriate (Sagginio & Kline, 1996). The factor structure obtained from the EFA was examined using confirmatory factor analysis (CFA) on the second set of 252 older peoples.

Average variance extracted (AVE), maximum shared squared variance (MSV) and average shared square variance (ASV) were estimated to assess the convergent and discriminant validity of the extracted HHI factors. In order to establish convergent validity (i) AVE should be greater than .5 and (ii) construct reliability (CR) should be greater than AVE. To meet the discriminant validity criteria, both MSV and ASV of each construct should be less than its AVE (Ahadzadeh, Pahlevan Sharif, Ong, & Khong, 2015; Hair Jr, Black, Babin, & Anderson, 2010).

## ***Reliability assessment***

The reliability of the HHI-Persian was first assessed through evaluating its internal consistency and Cronbach's alpha ( $\alpha$ ), Average inter-item correlation (AIC) and McDonald Omega ( $\Omega$ ) (H. Sharif Nia et al., 2017). Next, Composite Reliability (CR) was calculated. Coefficients of



reliability of 0.7 or greater show satisfactory reliability (Jorritsma, de Vries, Dijkstra, Geertzen, & Reneman, 2012).

**Multivariate normality and outliers**

To evaluate normality it is helpful to assess both Univariate (for Outliers and Skewness and Kurtosis) and Multivariate normality using Mardia’s coefficient of Multivariate kurtosis whereby a Mardia’s coefficient > 8 indicates deviation of Multivariate normality (Raoprasert & Islam, 2010). Multivariate outliers can be evaluated using Mahalanobis distance ( $P < .001$ ) (Harrington, 2008; Tabachnick & Fidell, 2013). All of statistical procedures were analyzed by SPSS-AMOS<sub>24</sub> and JASP <sub>0.9.0.1</sub>.

**Ethical consideration**

Mazandaran University of Medical Sciences Ethics Committee (IR.MAZUMS.REC.96 -10486) gave approval to this study. Participants were informed about study aims and procedures (e.g., that participation was voluntary and would not affect medical care) before signing an informed consent document. Participant confidentiality was assured by completing all study procedures in a quiet treatment area. All personal data were de-identified by assigning codes to the participants.

**Results**

**Sample characteristics**

Table 1 presents the demographic characteristics of participants in the study.

[Insert Table 1 here]

Table 2 shows the results of conducting MLEFA with Promax rotation on the HHI-Persian using the first dataset ( $N = 252$ ). Items 11 and 12 were deleted as they were identical to items 1 and 2 respectively. The KMO was .814, and the Bartlett’s test of sphericity was significant ( $p <$

.001, 978.946,  $df = 45$ ) indicating that the sampling was adequate. The Promax rotation indicated that (i) eight items loaded on the first factor which explained 37.892% of the post-rotation variance and (ii) two items loaded on the second factor with 11.329% of the post-rotation variance. Considering the items related to each factor, the two factors were named (i) Inner Connectedness and Positive Readiness and Expectancy and (ii) Loneliness and Fear for the Future. The total cumulative variance explained by these two factors was 49.220%.

[Insert Table 2 here]

Next, maximum likelihood CFA was performed to confirm and validate the factor structure obtained with EFA using the second dataset ( $N = 252$ ). Based on the modification indices, four pairs of measurement errors (between items 2 and 10, items 7 and 8, items 7 and 9, and between items 9 and 10) were allowed to freely covary (see Figure 1). The results show that after reviewing model modification indices for sources of model misfit, the model (consisting of two factors) has a good fit ( $\chi^2 (31, N = 252) = 75.794, p < .001$ ;  $\chi^2/df = 2.445$ , adjusted goodness-of-fit index (AGFI) = .900, goodness-of-fit index (GFI) = .943, comparative fit index (CFI) = .933, Tucker Lewis index (TLI) = .903, incremental fit index (IFI) = .934, standardized root mean square residual (SRMR) = .0545, and root mean square error of approximation (RMSEA) = .076 (90% confidence interval = .054–.098)). The convergent and discriminant validity of the two extracted subscales were assessed using CR, AVE, MSV, and ASV. CR of factor 1 was .877, which showed good construct reliability and convergent validity. CR of factor 2 was .692, which was close to the most widely used cutoff value of .7 and greater than .6 for psychological constructs. The lower CR of the second factor can be because this factor consisted of only two items. Cronbach's alpha and McDonald Omega for all of items were .821 (CI95: .797 to .843) and .859 respectively for both the factors.

The AVE of the first and second constructs was .473 and .539, respectively. Although the AVE of the first factor was less than .5 but it was close to the suggested threshold. AVE is a strict measure of convergent validity and CR alone can be used to assess convergent validity of psychological constructs. Since the CR of the first factor was .877, it was sufficient to meet the requirement of convergent validity. For discriminant validity, AVE should be greater than ASV and MSV. The two constructs had a very low correlation and as a result a negligible average and maximum shared variance, providing support for discriminant validity. Both the factors met the requirements for convergent validity in which the composite reliability was .877 and .692, respectively. The results of the present study achieved convergent and discriminant validity.

[Insert Figure 1 here]

[Insert Table 3 here]

Discussion

This study tested the psychometric properties of the HHI-Persian Scale. Exploratory factor analysis produced two-factor structure compared to the original three-factor structure by Herth (Herth, 1992). Factor one has 8 items and Factor two has 2 items. While this two-factor structure is similar to many of the studies conducted in the past (Benzein & Berg, 2003; Koizumi et al., 1999; Wahl et al., 2004), the items loaded were different. Comparing the Factors obtained in this study with the original Herth Hope Index (HHI) (1992) shows that Factor 1 in this study is difficult to interpret as the items that are loaded are found in all the three factors in Herth’s study (Herth, 1992). Two of items loaded (goals and positive outlook toward life) measure inner sense of temporality and future as found in Factor 1 of Herth’s study (1992). Items “A sense of direction” and “Recall happy/joyful times”) loaded on Factor 1 of this study relate to Factor 2 of

Herth's study (1992), and a further three items are similar to the items in interconnectedness with self and other (Factor 3 of Herth, 1992: "faith that comforts", "deep inner strength", and "give and receive caring/love"). In this study, Factor 2 has two items "feel all alone" and "scared about the future" are loaded on Factor 3 and Factor 1, respectively in the original HHI. The difference in factor structure found in the present study and Herth (1992) could be due to the cultural environment in Iran and the sample population. In the present study, data used in the analysis are data from older population in the community while the sample for Herth (1992) consisted of ill adults.

Compared to the study of Wahl et al. (2004) which drew sample from the general population in Norway, the study reported a two-factor structure. Interestingly, the items that were loaded on Factor 2 in Wahl et al. (2004) were the same as found in the present study: "scared about the future" and "feel all alone". For Factor 1, the items loaded in both studies had seven common items. While we found 8 items loaded on Factor 1 and two items on Factor 2, Wahl et al. (2004) also had 8 items loaded on Factor 1, 2 items loaded on Factor 2 and another 2 items loaded on both factors. Comparing to the study on urban population by (Koizumi et al., 1999), this study elucidated two factors whereas Koizumi obtained a unidimensional factor structure. The different factor loadings of these studies could be due to the different national and historical experiences. In interpreting the results of the present study, it is important to bear in mind that Iran is a homogeneous Islamic nation. It is for this reason that the same items loaded on Factor 2 in two distinct countries: Norway in the West and Iran in the Middle East, is interesting, which warrants further research.

For Factor 1, the items that had high loadings are: able to give and receive caring/love (.755), recall happy/joyful times (.716) and deep inner strength (.710). These items reveal

interconnectedness with self and others, and they are about relationships that are important to older adults. Yaghoobzadeh et al (2018) in their study indicate that interaction has impacts on hope in patients who have unimpaired cognitive functioning. Also, it has the ability to enhance the self-respect of older adults, which is linked to the increased life satisfaction (Yaghoobzadeh et al., 2018).

Comparing the item loadings with the study of Wahl et al. (2004), the same items had loadings of .584, .442, and .620, respectively for “able to give” and “receive caring/love”, “recall happy/joyful times” and “deep inner strength”, which are all lower than the present study. The high loadings could be due to the collectivist nature of Iranian society and perhaps the Islamic faith compared to the more individualistic Western societies. In the second factor, "feeling alone" has the higher factor loading at .865. It is obvious that feeling loneliness is a miserable feeling for all groups including older adults.

The reliability of the present index was in the acceptable range although lower compared to past studies. The Cronbach’s alpha for Factor 1 and Factor 2 are .876 and .571, respectively, with an overall internal consistency of greater than .8, which shows good internal consistency. The overall Cronbach’s alpha for Herth (1992) was 0.97, and it was 0.81 for the Norwegian study by Wahl et al. (2004). HHI-Dutch reported Cronbach’s alpha of 0.84 (Van Gestel-Timmermans et al., 2010), while HHI-German was at 0.82 (Geiser et al., 2015), 0.89 for the Japanese study among urban population (Hirano et al., 2007). AIC of the factors were greater than .4. The AIC of the items should be ranged between .2-.4, while ideals in the range .1-.5 are acceptable (Cox & Ferguson, 1994). The AIC for the two sub-scales were .452 and .400, respectively, thus demonstrating reasonable reliabilities.

According to the final model of HHI-Persian, there is a link between measurement errors of items 9<sup>th</sup> and 7<sup>th</sup> (e9, e7), 9<sup>th</sup> and 10<sup>th</sup> (e9, e10), 7<sup>th</sup> and 8<sup>th</sup> (e7, e8), and 2<sup>th</sup> and 10<sup>th</sup> (e2, e10). Correlated measurement error arises from the situation when variables have not been recognized clearly or not measured openly (Munro 2005). Self-reported measurement method may cause measurement errors. Conversely, measurement errors can be the consequence of using similar words and expressions in both positive and negative statements (Hamid Sharif Nia et al., 2016). Correlated measurement error can be used as a scale reduction technique to finalize and then confirm final structural scale (Floyd & Widaman, 1995).

### ***Limitations***

One of the limitations of this study is the convenience sampling method that limits the generalizability of the findings. Future studies should consider using a more representative sample. In addition, further studies should include other measures to test the nomological validity of the scale and to examine hope among different segments of the population.

### ***Conclusions***

The Herth Hope Index that was first developed in the US was translated into the Persian language and tested for reliability and validity using a convenience sample of healthy older adults in Iran. Although the Index was first administered on ill or chronically ill people to assess their condition, the 12-item scale has been tested among healthy older individuals in the general population. To our knowledge, this is the first study that attempted to assess the validity and reliability of the scale among older people in an Asian context. The HHI-Persian Scale as a whole has good internal consistency and it has achieved the requirements for psychometric properties. The practical implication of this study shows that in clinical settings as in the general population, the Scale is reliable in assessing older adults to aid them in the coping process.

**Declaration of Conflicting Interests**

The authors declare that there is no conflict of interests.

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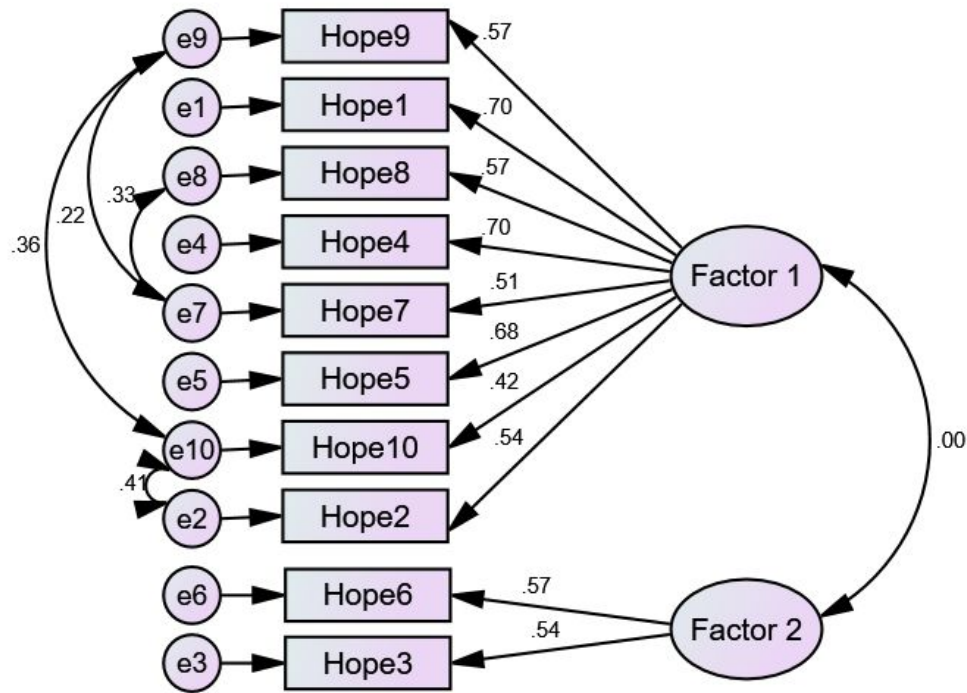
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**Figure 1.** The final structural model of HHI among elders.

Table 1. Demographic profiles of respondents

Variables	N (%) or Mean (SD)	Variables	N (%) or Mean (SD)
<b>Sex</b>		<b>Present Socio-economic Status</b>	
Male	214 (42.5%)	Poor	85 (16.9%)
Female	290 (57.5%)	Average	334 (66.3%)
<b>Age</b>	66.20 (5.76)	Good	85 (16.9%)
<b>Marital Status</b>		<b>Main Income Resources</b>	
Single	27 (5.4%)	Personal	170 (33.7%)
Married	386 (76.6%)	Family	77 (15.3%)
Widow/divorced	91 (18.1 %)	Pension	257 (51%)
<b>Educational Status</b>		<b>Relative Visiting</b>	
Illiterate	119 (23.6%)	Sometimes	253 (50.2%)
Guidance	300 (59.5%)	Often	157 (31.2%)
Diploma	26 (8.7%)	Very Much	94 (18.7%)
Collegiate	29 (5.8%)	<b>Emotional Support</b>	
<b>Present Living Place</b>		Family	475 (94.2%)
Personal	463 (91.9%)	Friends & colleagues	29 (5.8%)
Children	41 (8.1%)		

**Table 2.** Maximum likelihood factor analysis in the HHI with two factors

Factors Name	Items	$h^2$	Factor Loading	$\lambda$	% Variance	Internal consistency
<b>Inner Connectedness and Positive Readiness and Expectancy</b>	<i>9. I am able to give and receive caring/love</i>	.569	.755	3.788	37.892	$\alpha$ = .876 $\Omega$ = .735 AIC=.452
	<i>7. I can recall happy/joyful times</i>	.510	.716			
	<i>8. I have deep inner strength</i>	.501	.710			
	<i>1. I have a positive outlook toward life</i>	.484	.697			
	<i>10. I have a sense of direction</i>	.462	.670			
	<i>4. I can see possibilities in the midst of difficulties</i>	.454	.663			
	<i>5. I have a faith that gives me comfort</i>	.447	.662			
	<i>2. I have short and/or long range goals</i>	.419	.617			
<b>Loneliness and Fear for the Future</b>	<i>3. I feel all alone</i>	.748	.865	1.172	11.329	$\alpha$ = .665 $\Omega$ = .778 AIC=.400
	<i>6. I feel scared about my future</i>	.330	.574			

**Abbreviations;**  $h^2$ : Communalities,  $\lambda$ : Eigenvalue, AIC: Average inter-item correlation,  $\alpha$ : Cronbach's alpha,  $\Omega$ : McDonald's omega

**Table 3.** The results of convergent validity and composite reliability

Factors	CR	AVE
Inner Connectedness and Positive Readiness and Expectancy	.877	.473
Loneliness and Fear for the Future	.692	.539

**Abbreviations:** CR: Composite reliability; AVE: Average Variance Extracted

**Implication for practice:** The Persian version of HHI is considered to be valid and reliable scale. Therefore, it can be suggested to be used in practice to measure hope of older peoples. Determining this will help health care providers to consider plans in order to enhance older peoples' hope and their mental well-being.

What does this research add to existing knowledge in gerontology?

- Hope is an important aspect of mental health recovery and a major concern in older peoples.
- The HHI-Persian is appropriate for research in the recovery process of older peoples.
- The HHI-Persian has shown to be an instrument with adequate psychometrical properties.

What are the implications of this new knowledge for nursing care with older people?

- Determining hope will help health care providers to consider plans in order to enhance older peoples' hope and their mental well-being.

How could the findings be used to influence policy or practice or research or education?

- The HHI briefness and suitability for clinical use make the instrument also an appropriate tool for research and clinical interventions regarding hope in people with severe mental illness.

The objective of this study was to examine the psychometric characteristics of the Persian version of the Herth Hope Index (HHI-Persian) within a sample of 500 Iranian elders during December 2015 and April 2016 in Qazvin, Iran. The HHI was forward translated from English into Persian and back translated to English. Psychometric properties of the HHI-Persian evaluated using face, content, and construct validity. The construct validity of the instrument tested using exploratory and confirmatory factor analysis. Reliability also assessed. Construct validity of the scale showed two factors with eigenvalues greater than one accounted for 49.22 % of the variance. The Cronbach's alpha, Theta, McDonald, and construct reliability were greater than .70 showed good reliability of the index. The HHI-Persian is a short, reliable, and valid scale of hope in elders' population. Further research suggested to give more insights to understand possible factorial solution and subscales in different cultures and contexts.