ORIGINAL ARTICLE

Farsi version of the Multidimensional Health Locus of Control and God Locus of Health Control Scales: validity and reliability study among Iranian women with a family history of breast cancer

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Abstract

Objective: To determine the Persian version's reliability and validity of the Multidimensional Health Locus of Control and God Health Locus of Control scales among women with family history of breast cancer.

Methods: The cross-sectional study was conducted in Sabzevar, Iran, in 2012. It randomly selected women with family members affected by breast cancer. Predesigned questionnaires were completed through interviews. Content and face validity was evaluated using the opinions of a panel of experts, and construct validity was confirmed by applying confirmatory factor analysis. The instruments' reliability was assessed using Cronbach's alpha and test-retest reliability.

Results: There were 200 women in the study with their age ranging between 18 and 69 years and revealed the following; root mean square error of approximation for Multidimensional Health Locus of Control Scale = 0.013, and God Locus of Health Control Scale = 0.077; comparative fit index = 0.999, 0.998; incremental fit index = 0.999, 0.998;Tucker-Lewis fit index = 0.998, 0.998; and normed fit index = 0.983, 0.997 respectively. Cronbach's alpha was 0.61 for Internal Health Locus of Control, 0.8 for Chance Health Locus of Control, 0.68 for Power Health Locus of Control and 0.9 for God Locus Health Control.

Conclusion: The Persian version of the subscales supported the main version.

Keywords: Breast cancer, Multidimensional Health Locus of Control, God Locus of Health Control, Validity, Reliability.
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Introduction

Breast cancer is one of the most prevalent cancers in most countries.[1] In Iran, it is the third highest cause of mortality.[2] In the United States, breast cancer is the second most prevalent of all cancers.[3] Nearly half (48%) of breast cancer cases are diagnosed in the 50-69 age group.[4] The prevalence of the disease among Iranian women is increasing and these women are affected on average 10 years younger than women in Western countries.[1] The risk of developing breast cancer among women with a family history of disease increases by up to 15%; specifically with close family members (mother, daughter or sister).[5] On the other hand, studies have shown that mortality due to breast cancer reduces by up to 16% when diagnosed earlier as a result of getting mammography[6] and by up to 29% among women between 40 and 49 years of age.[7]

While many factors may influence women's decision to adopt prevention-oriented behaviours regarding breast cancer, researchers have emphasised the importance of individual responsibility.[8] Therefore, women's belief in their responsibility towards their own health may lead to the adoption of appropriate health behaviours as an internal motivation.

Locus of control is an important concept in psychology.[9] The concept has been derived from the theory of social learning (TSL) and focuses on individuals who believe in the good or bad results of the factors that affect health in their lives. The Health Locus of Control (HLC) is one of the most widespread parameters of measuring health beliefs to plan health education programmes. It highlights the degree to which an individual believes his or her health is controlled by internal or external factors.[9]

Those who believe in the external locus of control assume that factors, including physicians, chance, or fate influence their health outcome, while those who believe

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in the internal locus of control assume that their health outcome is due to their own behaviour and performance. In other words, they hold themselves responsible for events; they take responsibility and blame themselves for the problems and difficulties in their lives. Such a belief has significant consequences for an individual. In contrast, those who believe in external HLC assume other people, chance, fate, or, in particular, the God to be responsible for events and blame them. Hence, they feel no need to change their behaviour.[10]

The Multidimensional Health Locus of Control (MHLC)[10] scale originally contained three subscales describing various types of control-related cognitions an individual may have about his or her current state of health:

Internal HLC (IHLC) shows to what degree one believes his/her behaviour and internal factors are responsible for health and sickness;

Powerful others HLC (PHLC) shows to what extent one believes that others determine his/her health; and Chance HLC (CHLC) shows to what degree one believes that health depends on chance.

The MHLC scales consist of three forms of A, B and C. A and B are parallel forms and either one can be used, while Form C is applied for either the sick or to measure HLC under special conditions.[11]

The psychometric properties and practical utility of the MHLC scales have been established in a number of studies since the 1970s.[12] Further, this scale has been established as a valid and reliable instrument for use in Iran.[13] Demographic characteristics are of great importance while applying the appropriate data-collection instrument. The same is true of cultural and personal characteristics of individuals because population characteristics may affect an instrument's reliability and validity.[14] Also, the presence of a patient with breast cancer in the family can be considered a stimulus factor for further prevention and increase the susceptibility of people against this disease.

On the other hand, in many cultures, values and religious principles form the roots of other beliefs. If an individual believes that God is responsible for everything and every creature and their fate has already been decided, he/she will consider that his/her health is subject to fate. However, if an individual thinks about life in a scientific and objective way, he/she will yield to the internal HLC.[15] In Iran, Islam is the state religion with 98% of the population as adherents; 89% are Shi'a and 9% are Sunni.[16]

Religious beliefs and belief in a superior controller are among effective factors that determine health outcomes and play an important role in motivating disease prevention, but have not been given adequate consideration.[15]

God Locus of Health Control (GLHC) was introduced in 1996[17] and was subsequently added to MHLC. Several studies have confirmed the effect of believing in God on a believer's self-care behaviour.[15,18] However, the validity and reliability of this scale is not yet measured in Iran.

The current study was conducted in Sabzevar, which is one of Iran's underdeveloped cities with unique religious, cultural, and ethnic characteristics. The city is in the north-east of the country, in Razavi Khorasan province, and has a population of 400,000.

The aim of the study was to translate and measure the validity and reliability of GHLC and MHLC scales for a research sample with a family history of breast cancer to identify the participants' belief toward HLC.

Subjects and Methods

The cross-sectional study was conducted in 2012 in Sabzevar, Iran. A local health centre initially invited 213 women affected with breast cancer who had survived for at least five years (2007-12) to participate in the study. They were asked to introduce other female family members, resulting in a sample of 323 individuals. Inclusion criteria required subjects with at least one female family member affected by breast cancer (mother, sister or daughter); at least 18 years of age; being a resident of Sabzevar for at least 10 years; lack of suspicious mass in breasts according to mammography, ultrasound or self-examination; and absence of chronic diseases.

In Structural Equation Modelling (SEM) analysis, optimal and minimum sample sizes were 200 and 100, respectively.[19] The study subjects were selected randomly to complete the GHLC and MHLC questionnaires through an interview. Form A of the MHLC scale was used. It consists of 18 items with three IHLC, PHLC and CHLC subscales. Each subscale contains six items with a six-point Likert response ranging from ''Strongly Agree'' to ''Strongly Disagree''. Scales are scored by adding the respective items for a total scale score. Higher scores reflect stronger endorsement of MHLC scale.[13] The GLHC consists of six items and is similar in format to the other MHLC scales. The GLHC scale can be used alone or incorporated within the MHLC scales.[12]

Based on accepted guidelines, the instrument was translated and culturally adapted from English into Persian.[20] These guidelines included simultaneous

translations and blind back-translations followed by group consultation with bilingual experts. Further, to increase the efficacy and to strengthen cultural adaptation, additional methods that included an expert panel, a committee review, and pilot testing, were used.[20] The translators were two qualified bilingual individuals from Iran having different educational levels. Two other bilingual health specialists, also from Iran, with the same level of education, performed the blind back-translation. The authors reviewed the translation of the instrument and together with the developers reviewed the back-translation. To ensure the cultural adaptation, an expert panel comprising three health education and health promotion professors, two health psychology professors, two nursing faculty members from the Public Health Department and one gynaecologist discussed the instrument. The revisions made related to some grammatical wording and phrasing to maintain similarity of meaning of each item in the context of the Iranian culture.

A pilot study was conducted to test whether the translated versions were easy to comprehend by the locals. Thirty subsamples of women were randomly recruited and asked to read and evaluate the content of the instruments to judge the items for their readability and clarity. Participants felt that the questions were easy to understand.

SPSS 20 was used for data analysis. Further, AMOS 16 was used for construct validity. Reliability was evaluated using Cronbach's alpha and test-retest correlation. For test-retest correlation, we randomly selected 30 subsamples to complete the scale 28 days after the participants had completed the scale for the first time. We compared the test-retest scores for each dimension using Pearson's correlation test. The desired criteria of item-total correlation of greater than 0.30 are acceptable and according to original version which states modest reliability ranges from 0.60-0.75[10] α level equal to or greater than 0.60 were considered desirable. To examine validity, a content validity index (CVI) was used. It was used to quantify the extent of agreement between the experts in the study. The expert panel was asked to rate the feasibility and relevance of each item on a scale from 1 (irrelevant) to 4 (highly relevant and succinct).

The CVI of the scale was calculated by dividing the number of items rated 3 or 4 by the total number of items, and greater than 80% was regarded as a standard for testing expert validity.[21]

The construct validity of the questionnaire was evaluated with a confirmatory factor analysis (CFA) using maximum likelihood (ML) estimation in AMOS. The exploratory factor analysis is applied at the early stages of research and provides the prerequisites for the compilation of the dependent variables around a structure called the factor. In CFA, the researcher selects the variables with an idea already formed to explain the underlying processes creating the factor or factors. It is designed to confirm previous findings by allowing researchers to explore data with the aid of theory, modification index, and/or the pattern and significance of factor loading. Generally, a loading of a value $\geq$0.3 is considered acceptable. A model fit is acceptable if the χ^2/df ratio is lower than 2, the comparative fit index (CFI), normed fit index (NFI), incremental fit index (IFI), and Tucker-Lewis fit index (TLI) are higher than 0.90, and if the root mean square error of approximation (RMSEA) is lower than 0.08.[22] For all statistical analyses, a two-tailed p value of less than 0.05 was considered statistically significant.

Results

Of the initial pool of 323 individuals, 14(4.3%) women were excluded as they declined to participate in the study. From the remaining 309, 200(64.7%) subjects were selected for the study as per the requirement of the sample size.

Demographic characteristics of the participants were noted

Table-1: Demographic characteristic of Iranian with family breast cancer (n=200).

Variable	Family breast cancer (n)	(%)
Age (Years)		
18-28	23	11.5
29-39	89	44.5
40- 50	42	21
>51	46	23
Educational level		
Illiterate	17	8.5
Primary	83	41.5
High school	45	22.5
University/college	55	27.5
Marital status		
Single	18	9
Married	169	84.5
Widowed	9	4.5
Divorced	4	2
Occupational status		
House wife	158	79
Employed	24	12
Worker	2	1
Self-employed	7	3.5
Unemployed	9	4.5
Relationship with patients		
Daughter	112	56
Sister	84	42
Mother	4	

Table-2: The means (minimum-maximum) and standard deviations of the subscales.

Subscales	Minimum	Maximum	Mean	Std. Deviation
Form A				
IHLC	2.83	6.00	5.15	0.52
CHLC	1.33	5.67	3.34	1.18
PHLC	2.33	6.00	5.08	0.67
GHLC	1.67	6.00	4.39	1.46

IHLC: Internal Health Locus of Control.
CHLC: Chance Health Locus of Control.
PHLC: Powerful others Health Locus of Control.
GHLC: God Health Locus of Control.

Table-3: Item-Total Correlation and Cronbach ? for Subscales and Paired samples correlations of Form A by using test-retest.

Subscales	N. Items	Item-Total subscales Correlation	Cronbach α coefficient	Test-retest correlation
IHLC	6	0.30-0.52	0.61	0.70; p<0.001
CHLC	6	0.46-0.62	0.80	0.67; p<0.002
PHLC	6	0.32-0.58	0.68	0.78; p<0.001
GHLC	6	0.52-0.72	0.90	0.80;P<0.0001

IHLC: Internal Health Locus of Control.
CHLC: Chance Health Locus of Control.
PHLC: Powerful others Health Locus of Control.
GHLC: God Health Locus of Control.

Table-4: Confirmatory Factor Analysis for MHLC and GLHC Items.

Subscale	Item	Standardized Regression Weight	Critical Ratio
Internal	1. If I get sick, it is my own behaviour which determines how soon I get well again.	0.4	-
	6. I am in control of my health	0.51	2.25
	8. When I get sick, I am to blame	0.25	2.89
	12. The main thing which affects my health is what I myself do	0.83	6.47
	13. If I take care of myself, I can avoid illness.	-0.11	-1.67
	17. If I take the right actions, I can stay healthy	0.3	3.65
Chance	2. No matter what I do, if I am going to get sick, I will get sick.	0.83	-
	4. Most things that affect my health happen to me by accident.	0.31	4.27
	9. Luck plays a big part in determining	0.81	11.56
	11. My good health is largely a matter of good fortune	0.99	11.18
	15. No matter what I do, I 'm likely to get sick.	0.63	7.97
	16. If it's meant to be, I will stay healthy	0.05	0.82
Power	3. Having regular contact with my physician is the best way for me to avoid illness	0.82	-
Others	5. Whenever I don't feel well, I should consult a medically trained professional	0.5	7.97
	7. My family has a lot to do with my health	0.83	13.5
	10. Health professionals control my health	-0.03	-0.43
	14. Whenever I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me	0.34	5.07
	18. Regarding my health, I can only do what my doctor tells me to do	-0.11	-1.86
God	1. If my health worsens, God determines whether I feel better again.	0.69	-
	2. Most things that affect my health happen because of God.	0.37	4.92
	3. God is responsible for my health getting better or worse.	0.5	6.58
	4. Whatever happens to my health is God's will.	0.89	13.06
	5. Whether or not my health improves is up to God.	0.99	13.2
	6. God is in control of my health.	0.92	14.24

MHLC: Multidimensional Health Locus of Control.
GHLC: God Health Locus of Control.

(Table-1). The mean age of the sample was 40.14±11.81 years (range: 18-69). Mean values of the overall scale and the score of the subscales were also worked out (Table-2).

For the six-item IHLC Cronbach alpha, the correlation coefficient was 0.61; for the six-item CHLC Cronbach alpha, the correlation coefficient was 0.8; for the six-item (PHLC) Cronbach alpha, the correlation coefficient was 0.68. Further, for the six-item GLHC Cronbach alpha, the correlation coefficient was 0.9 (Table-3). The stability of these scales were 0.70 (p<0.001), 0.67 (p<0.002), 0.78(p<0.001), and 0.80(p<0.0001) respectively.

The CVI for IHLC was 0.965, for CHLC 0.980, for PHLC 100, and for GLHC it was 100.

In CFA, the MHLC scale included 18 items in three

subscales. The results of CFA of the general model with 18 items in three subscales indicated that the ratio of chi-square to degrees of freedom was equal to 1.035 χ^2/df=45.547/44=1.035, P=0.408. The value of RMSEA was 0.013 with a confidence interval (CI) of 0.050 and 0.001. Further, the value of CFI was 0.999, IFI was 0.999, TLI was 0.998, and NFI was 0.983, confirming the adequacy of the model (Table-4).

CFA of the GLHC scale, which included six items, indicated that the ratio of chi-square to degrees of freedom was 2.182 χ^2/df=(4.365)/2=2.182, P=0.113. The value of RMSEA was equal to 0.077. Further, the value of CFI was 0.998, IFI was 0.998, TLI was 0.998, and the value of NFI was 0.997, confirming the adequacy (Table-4).

Discussion

In this study, a psychometric test of MHLC and GLHC subscales were conducted using the related Persian versions. The sample consisted of women with a family history of breast cancer. The results showed that Form A of MHLC scale and the GLHC subscale had acceptable validity and reliability within the sample. The content validity of all subscales' items were confirmed by an expert panel with the cooperation of the randomly selected women in the sample in relation to the items' clarity as well as being in conformity with the local culture.

In the present study, the reliability of Form A was similar to one earlier study.[10] (range: 0.67-0.77) as well as to many others.[13,18,23] Further, the Cronbach alpha coefficient for GLHC subscale exhibited good internal consistency and was sufficiently adequate. This is similar to literature[12] where the range has been calculated to be 0.87-0.94 for all the three samples.

The God subscale has a higher degree of internal consistency than the other three subscales, which is similar to that of a study,[18] which reported Cronbach alpha coefficient for GLHC to be 0.88 and for IHLC, PHLC and CHLC 0.6, 0.65 and 0.68, respectively.

The items of the GLHC subscale were confirmed and revealed a high correlation between the items of MHLC subscales. A study[13] also reported an acceptable internal correlation.

The goodness of fit of the model revealed that the above-mentioned sub-scales' Persian versions were similar to those of an earlier study,[18] which reported goodness of fit using CFA. Further, a study[13] confirmed the MHLC's three subscales using CFA.

Moreover, the results of this study revealed that the GLHC items have been confirmed by CFA as reported earlier.[18,23] The highest and lowest scores were related to internal factors and chance, respectively, and were similar to previous studies.[13,18,24] Among studies in various populations, the highest score relates to IHLC and seemingly the difference among the subscale scores are of great importance in comparisons and conclusions. Since this study suggested a very low score difference between IHLC and PHLC, the research participants had similar beliefs in relation to IHLC and PHLC; the difference between the two averages was more significant[13] and they were too close.[24]

Studies have revealed that MHLC Form A is of acceptable validity and reliability.[10] The same was true in the present study.

In terms of limitations, the participants were selected from families of women living with breast cancer since there was no access to the families of individuals who did not survive the disease. The selected participants were females because they have higher prevalence and were more accessible and eager to participate relative to men. Also, External validity and convergent validity in this study was not done. However, all subjects belonged to families with history of the disease, which was the strength of the current study. The Persian version of the scale may give nurses and other health authorities a perspective of cancer-infected individuals' beliefs concerning HLC in the family as well as of those family members who are at risk. This knowledge will be useful in planning an appropriate educational intervention, promoting cancer-preventive behaviours, and specifically in motivating women to undergo mammography.

Conclusion

Being the first report on the psychometric properties of GLHC scale among Iranian women, the study supports the Persian version of MHLC and GLHC scales on the assessment of Iranian women's beliefs about preventive breast cancer behaviours. The scales can be of great value for use in education and assessment of the family members of patients with breast cancer or cancers of any kind in Iran and other Persian-speaking communities.

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