Research Paper
Translation and Psychometric Evaluation of the Partners in Health Scale Among Iranian Adults With Chronic Diseases

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ABSTRACT

Objectives: Characterizing the psychometric attributes of the Persian variant of partners in health (PIH) in multiple sclerosis (MS), Diabetes, and Low Back Pain (LBP) patients.

Methods: In this cross-sectional study, 183 MS, diabetes, and LBP patients (70 male, 113 female) were treated with PIH post-forward-backward translation. Confirmatory factor analysis was used for studying the factor structure. Cronbach's α and McDonald's Ω coefficients were used to analyze PIH internal consistency. We used an interclass correlation coefficient to evaluate test-retest reliability. Criterion validity was determined by studying the correlation of PIH and Short Form (36) Health Survey (SF-36), Diabetes Self-Management Scale (DSMS), and Self-Efficacy in Chronic Disease Self-Management (SES6G).

Results: The median age of the participants was 49.73±15.16 years, 113 (61.75%) of them were female, 64 (35.0%) had MS, 66 (36.1%) had diabetes, and 53 (29.0%) had LBP. Content validity was determined across all areas (clarity, relevancy, simplicity) by a content validity index ≥0.82. Additionally, all items were confirmed via a content validity ratio ≥0.78. The outcome of CFA depicts that the statistics presented as model fit were as follows: CFI= 0.938, NFI= 0.899, and RMSEA= 0.085. All PIH items exhibited valid internal consistency (0.886-0.893). The PIH showed sufficient test-retest reliability regarding its corresponding subscales (0.554-0.679). The construct validity was confirmed by the total scores of PIH correlated with the total score of SF-36, SES6G, and DSMS.

Discussion: The Persian variant of the PIH showed sufficient validity and reliability as a measure to assess self-management in patients suffering from chronic disease (MS, diabetes, and LBP).

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Highlights

• Numbers of chronic disease patients are increasing; the worldwide health systems are facing a serious challenge.

• Many developed nations have begun to utilize self-management and education programs.

• Self-management is based on the principles of self-regulation, self-control, and self-efficacy.

• Partner in Health (PIH) scale is a generic tool for measuring self-management across varied range of chronic conditions.

• This study evaluated validity and reliability of Persian version of partners in health inventory.

• According to the results Persian version of the PIH is a valid and reliable measure for assessing self-management in patients with chronic disease.

Plain Language Summary

The Persian version of the PIH is a valid and reliable tool for evaluating self-management in patients with chronic disease.

1. Introduction

The increasing burden of chronic diseases is one of the serious issues the worldwide health system grapples with in the 21st century. The World Health Organization reports that the occurrence of chronic diseases is on the rise in developed and developing nations. Nearly two-thirds of all fatalities worldwide are attributed to chronic diseases with 41 million deaths each year. The leading causes of death across the globe are all chronic diseases, such as heart disease, chronic respiratory disease, and diabetes [1].

Acute disease care systems find and treat relevant patients and facilitate their rapid release back to society, but the treatment of individuals with chronic disease differs due to disease comorbidity, social conditioning, and the patients' need for constant care throughout their lives [2].

The past decade experienced the development of new treatments for chronic disease patients but these individuals still face daily difficulties due to their conditions [3]. Because the number of chronic disease patients is increasing, the health system faces a serious challenge, as it aims to optimize existing health resources [4]. As such, many developed nations have begun to utilize self-management and education programs [5, 6].

The concept of self-management is based upon Albert Bandura's cognitive social theory, based on the ideas of self-regulation, self-control, and self-efficacy [7]. Self-management constitutes an individual's capability to cope with all the aspects of chronic disease. These include symptoms, the treatment process, physical and psychological social consequences, and lifestyle changes. With proper self-management, a patient would be able to self-observe their condition and apply the necessary cognitive, behavioral, and emotional changes required to keep up a satisfying life [8]. Self-management decreases the number of hospitalizations and the use of emergency facilities, as well as a general reduction in treatment costs [9].

A significant role in the management of chronic disease could be undertaken by occupational therapists. This type of therapy is patient-focused and facilitates the therapists to acquire the information and experience required to support the self-management of individuals suffering from chronic diseases. Occupational therapists assist chronic disease patients in meaningful activities, assist them in taking on valuable new roles, maintaining their previous ones, and in general, being productive members of society [10].

The existence of tools to screen self-management skills, understand individual requirements, and measure, results is the perquisite of implementing a successful self-management program. Several general-purpose and disease-specific tools have been developed. General-

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purpose tools allow for measuring self-management across many chronic diseases. One such tool is the Partner in Health (PIH) scale. It is a questionnaire meant to assess the main facets of self-management and can be employed for a wide range of chronic diseases, to measure the outcomes and changes in self-management over time. Despite the positive effect of self-management programs for the handling of chronic disease being widely supported, no Persian generic tool has yet been published in this field. As such, we translated the PIH scale and published a Persian variant after carrying out a validity and assessment study.

2. Materials and Methods

Multiple sclerosis (MS), diabetes, and low back pain (LBP) adult patients were selected as participants in a cross-cultural transition accompanied by a psychometric testing study. These individuals were selected from outpatient clinics and medical and rehabilitation centers in Tehran, Iran. The inclusion criteria involved being diagnosed with the mentioned chronic diseases (MS, diabetes, and low back pain) by a physician, is a legal adult (age 18 years or older), having a minimum literacy rate, and willingness to participate in the study. Participants who completed the scale incompletely were excluded from the study.

Procedure

Patients who met the previously stated selection conditions, voluntarily participated in the present study as they were visited by occupational therapists. They all were asked to sign the written precipitation consent form and then completed the PIH, Short Form-36 Health Survey (SF-36), Diabetes Self-Management Scale (DSMS) questionnaire, and self-efficacy for managing chronic disease 6-item scale (SES6G).

A different number of participants were selected for each stage of the research. Eighteen specialists were selected for content validity (three physicians, three occupational therapists, six physiotherapists, a psychologist, a prosthetic orthotics, and four audiologists and 183 patients to determine the construct validity, carrying out factor analyses, test-retest reliability, as well as internal consistency. Also, 32 people among the respondents in the validity phase were randomly selected after a one-month interval.

The study design was validated by the ethics committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1398.343).

Translation

The original tool creator allowed the translation. The translation was conducted following the official guidelines [11].

Two distinct PIH Persian translations were prepared by two different professional translators for the initial stage. A committee of experts in chronic diseases then reconsidered the translations and introduced the final version of the scale. This version was then translated back to English by a bilingual translator unfamiliar with the scale. This work was then sent to the original PIH creators who approved the reverse translation, confirming the conformity of the Persian translation with the PIH guidelines.

Content validity

The content validity was confirmed via the calculation of the content validity ratio and content validity index.

Content validity ratio (CVR)

The Lawshe method was utilized to compute the content validity ratio so that the necessity of every questionnaire item could be identified. The CVR then was computed on a three-point graph following the Lawshe method. The scoring of each item was based on three thresholds on the graph: 1, not necessary, 2, useful but not essential, 3, essential. A minimum of content validity would require that above half the experts state that the item could be identified as essential. The scale content validity would be approved if the CVR score is 0.78 or above [12].

Content validity index (CVI)

The appropriateness of the scale's items was assessed via a quantitative content validity index. A four-option Likert scale was used to analyze each of the items of the questionnaire with the following concepts: simplicity, specificity or relevance, and clarity. The simplicity was determined via a 4-choice Likert scale: a), complex, b), requires modifications, c), simple but needs to be reviewed, and d), clear and simple. Similarly, the specificity/relevance was then determined considering these options: a), not relevant, b), somewhat relevant, c), quite relevant, d), highly relevant. Lastly, the clarity of items was measured using options: 1, unclear, 2, somewhat clear, 3, quite clear, and 4, highly clear. Formula 2 was then applied for the quantitative evaluation of the CVI of the questionnaire. The acceptable CVI was 0.79. An option with a CVI measure below this would be deemed unaccepted and removed from the questionnaire. If the

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score was between 0.70 and 0.79, the item would be deemed as requiring review and changes [12].

Criterion validity

Criterion validity was tested by measuring the correlation between Persian PIH, SF-36, SES6G, and DSMS.

Instruments

Partners in Health (PIH)

The PIH scale, which was built at Flinders University, is used to assist in self-management evaluation in clinical health centers. The scale is composed of 12 items for a chronic condition patient to answer, and measures four elements of self-care: knowledge of the health condition, adherence to treatment, management of signs and symptoms, and management of side effects. This scale measures the primary facets relative to self-management across a series of chronic illnesses and is targeted at primary caregiver centers and their patients. Patients responded to individual questions on a Likert scale from 0-8, where 0 denoted 'very little', 'never' or 'not very well', and 8 showed 'a lot', 'always' or 'very well' [13].

36-Item Short Form Health Survey (SF-36)

The SF-36 is a healthcare utility that measures the quality of life across eight facets: physical functioning (PF-10 items), role limitations owing to physical problems (RP-4 items), bodily pain (BP-2 items), general health perceptions (GH-5 items), vitality (VT-4 items), social functioning (SF-2 items), role limitations because of emotional problems (RE-3 items), and perceived mental health (MH-5 items). Furthermore, an item belonging to SF-36 represents a change in the perception of overall health status after a one-year period, dubbed health transition [14]. Montazeri et al. [14] studied the psychometric properties of this tool.

Self-Efficacy for Managing Chronic Disease 6-Item Scale (SES6G)

SES6G comprises six elements, each represented as a 10-point Likert scale starting from 1 (not at all confident) to 10 (thoroughly competent). The scale could be interpreted by computing an average score obtained using four of the six items, thus authorizing two missing items in the response. These constitute a range from 1 to 10, and the greater the value, the greater the self-efficacy [15]. Eslami et al. validated this tool in Iran [15].

Diabetes self-management scale (DSMS)

The DSMS is based on the behaviors of individuals when managing their illnesses. The DSMS was developed by Lin et al. for the use of Chinese patients. The questionnaire's 35 items are separated into the following five factors: self-integration, self-regulation, interaction with health professionals and significant others, self-monitoring of blood glucose, and adherence to the recommended regimen. The DSMS is based on a Likert scale from 1-4, where 1 donated not relevant and 4 showed very relevant [16]. Thamasebi et al. evaluated this tool in Iran [16].

Statistical analysis

CVI and CVR were calculated for the purpose of determining content validity. CFA was used with the aim of determining whether the Persian version of PIH is aligned with the construction of the original PIH's four factors. Two primary tests were done to examine the data fit. KMO depicts a reasonable fit (0.6). KMO values equal to and above 0.6 are usable in factor analysis. Furthermore, Bartlet tests were significant ($P < 0.0000$), further supporting data fit and observable relations among variables that are meant for factor analysis [17].

Cronbach's alpha and McDonald's omega coefficients were used to determine PIH's internal consistency. Either of these coefficients is subjected to change ranging from 0, indicating complete lack of consistency, and 1, denoting total consistency and $\alpha \geq 0.9$ interpreted as excellent, <0.09 to 0.7 deemed as good, ≤ 0.7 to 0.6 believed to be as acceptable, <0.6 to 0.5 considered as weak, and an α <0.5 interpreted as unacceptable [18]. Additionally, ICC was used to determine the test-retest reliability of the scale. An ICC ≥ 0.75 is interpreted as excellent, <0.75 to 0.60 as good, ICC <0.60 to 0.40 is considered to be acceptable, and an ICC <0.40 is weak [18]. Furthermore, the Spearman correlation coefficient was computed between PIH, SF-36, and DSMS to determine PIH criterion validity. The absolute value of correlation coefficient ≥ 0.9 means a very strong correlation, 0.70-0.89 is strong, values in the range of 0.40-0.69 show moderate correlation, and finally, a correlation of 0.10-0.39 is considered a weak correlation [19]. SPSS software, version 22 was used for all the previously mentioned computations for CFA, which were carried out via LISREL version 8.80. All statistical tests were 2-sided, while the statistical significance level was adjusted at 0.05.

3. Results

The participants' demographic attributes are shown in Table 1. In this study, 183 patients completed the questionnaires, with one faulty submission. The minimum number of samples required for the study was 180. Of the 183 submissions, 70 were male while 113 were female. The mean age was 49.73±15.16 years and the age range was between 22 and 88. The educational levels of the participants were as follows: 9.9% elementary, 49.2% high school, and 41.0% university degrees, of them, 35.0% had MS (N=64), 36% had diabetes (N=66), and 29% had LBP (N=53).

Content validity

A CVI above 0.79 was calculated for all items when testing for relevance, clarity, and simplicity (Table 2). The CVR of item necessity was 0.78 and above, which means that the experts approved all 12 items (Table 3).

Reliability analysis

Table 4 tabulates PIH and its subscales' Cronbach's α coefficients. All subscales exhibited acceptable internal consistency values, between 0.886 and 0.893. McDonald's Omega coefficient was 0.891. The one-month PIH test–retest reliability with 32 patients using ICC resided in the acceptable range (0.554-0.679) (Table 4).

Concurrent validity

Spearman's correlation coefficients were calculated between PIH and the SF-36, SES6G, and DSMS to analyze PIHI concurrent validity. The outcome of the Spearman's correlation coefficient test exhibits a moderate correlation between a total score of the PIH scale with total scores of the SES6G on the one hand and DSMS scales and total score of the SF-36 questionnaire on the other hand (physical and mental component summary) (Table 5).

Table 1. Demographic characteristics of patients with MS, diabetes, and LBP

Demographic Characteristics		Mean±SD/No. (%)
Age, years		49.73±15.16
Gender	Male	70(38.3)
	Female	113(61.7)
Education level	Elementary	18(9.8)
	High school	90(49.2)
	University degree	75(41.0)
Marital status	Single	38(20.8)
	Married	128(69.9)
	Widow	11(6.0)
	Divorced	6(3.2)
Health condition	MS	64(35.0)
	Diabetes	66(36.0)
	LBP	53(29.0)

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Table 2. Content validity ratio results of PIH-FA

Item	1	2	3	4	5	6	7	8	9	10	11	12
CVR	1	0.78	0.78	0.78	0.78	0.78	1	1	1	1	1	1

Note: PIH: Partners in Health, CVR: content validity ratio

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Table 3. Content validity index results of PIH-FA

Item	CVI (Simplicity)	CVI (Relevancy)	CVI (Clarity)
1	0.89	0.94	0.94
2	0.94	0.94	0.86
3	0.97	0.97	0.97
4	0.91	0.97	0.86
5	0.86	0.91	0.82
6	0.94	0.94	0.91
7	0.97	1	0.97
8	0.89	0.94	0.89
9	0.97	0.97	0.91
10	0.89	0.94	0.86
11	0.97	0.97	0.94
12	0.97	0.97	0.97

Note: PIH: partner in health, CVI: content validity index

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Table 4. Reliability analysis of the PIH in patients with MS, Diabetes, and LBP

	Reliability Analysis	
Item	Cronbach's α (N=183)	ICC (N=32)
1	0.893	0.554
2	0.890	0.615
3	0.891	0.601
4	0.890	0.615
5	0.892	0.583
6	0.892	0.577
7	0.890	0.623
8	0.887	0.676
9	0.886	0.679
10	0.890	0.618
11	0.889	0.641
12	0.890	0.608
Total	0.898	0.881

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Note: PIH: partner in health, MS: multiple sclerosis, and LBP: low back pain, ICC: intra-class correlation

Table 5. Spearman's correlation coefficients between PIH and the SF-36, SES6G, and DSMS in patients with MS, Diabetes, and LBP

Measure		The Total Score of SES6G	The Total Score of DSMS	SF-36	
				Physical Component Summary	Mental Component Summary
The total score of PIH	Spearman Correlation Coefficient	0.665	0.565	0.282	0.351
	Sig. (2-tailed)	0.000	0.000	0.000	0.000

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Note: PIH: partner in health, SF-36: Short Form (36) Health Survey, SES6G: Self-Efficacy in Chronic Disease Self-Management, DSMS: Diabetes Self-Management, MS: multiple sclerosis, and LBP: low back pain

Factor analysis

Results of confirmatory factor analysis showed a fit model t with the following indices: $\chi^2/df=2.336$, TLI=0.914, CFI=0.938, NFI=0.899, RMSEA=0.085 (Figure 1).

4. Discussion

This work is a cross-sectional study aiming to translate the PIH from English into Persian and adapt it to the cultural and linguistic equivalence of the Iranian culture. A panel of specialists was formed among rehabilitation experts, and consultations with the tool's original developer resulted in the consensus that formed the final translated version. An analysis of the scale's psychometric attributes and their validity and reliability proved its effectiveness in assessing the self-management of individuals facing chronic diseases.

Checking for content validity is the initial step in determining the overall validity of a tool. This characteristic is based on the logical analysis of a test's content, and their evaluation based on subjective opinion. As such, the items of the test were shared with a panel of experts, and they were tasked with determining whether the questions were fit to measure the attribute they targeted. There is an agreement between the experts on a positive conclusion constitutes content validity [12]. The outcome of the analysis indicated that the Persian variant of PIH has acceptable CVR and CVI.
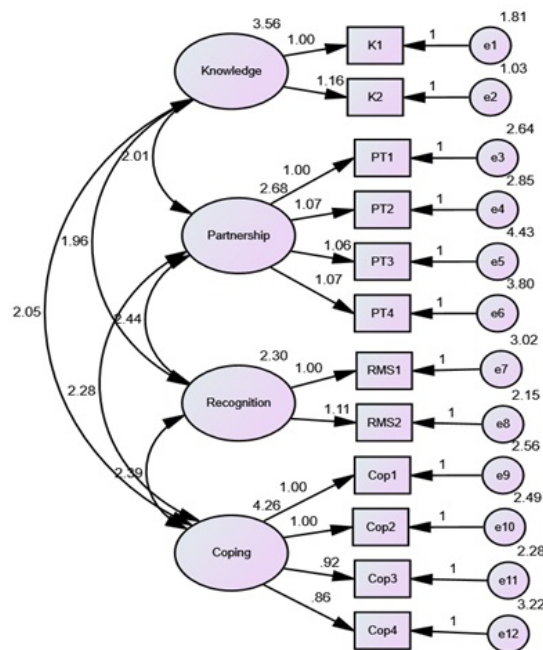

Figure 1. Results of confirmatory factor analysis

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As far as we know, this is the only factor structure analysis of PIH users who suffer from MS, diabetes, and LBP. The PIH scale comprises four facets. These are Knowledge (questions 1 and 2), Partnership in treatment (questions 3, 4, 5, and 6), Recognition and management of symptoms (questions 7 and 8), and Coping (questions 9, 10, 11, and 12). We identified that the Persian translation has sufficient content validity based on the outcomes of confirmatory factory analysis, indicated by the high values of the path coefficient and the significant p-values. These were NFI, CFI ≥0.90, and RMSEA near 0.08 [20, 21]. These findings support our presumption that the Persian PIH shares similar domains with the original tool (Knowledge, Coping, Management of symptoms, and Adherence to treatment).

Criterion validity shows the degree to which the points of a measuring tool are related to an independent external variable (criterion), which measures the target behavior or characteristic directly. Determining the criterion validity in this study consisted of figuring out the correlation between the total scores of the PIH-FA scale with those of SES6G, DSMS, and SF-36. The outcome supported a moderate correlation between PIH and the other three scales. As such, it is thought that the PIH scale can successfully assess self-management. Research in the field of self-management report that one of the desired outcomes of self-management is increasing the quality of life [22]. Therefore, this work studied the correlation between the PIH scale and the SF-36 scale. The result supports that change in self-management correlates with improvement in quality of life.

This study employed calculating Cronbach's alpha and McDonald Omega coefficients to analyze the internal consistency of the PIH scale's items. Excellent consistency was obtained for all the items (α=0.898 and Ω=0.891). Cronbach's alpha level was not increased by the removal of any of the items, and thus, it can be concluded that all the items are sufficient for clinical use and for self-management.

ICC was used to determine reliability in the sense of repeatability. The findings (ICC=0.881) indicated that the test-retest reliability of the Persian PIH scale was excellent. The results pertaining to the reliability test-retest) of the present study were consistent with the results obtained from other versions of this scale [23, 24].

The quantitative content validation process was one of the strengths of the present study. It is applicable and practical for health professionals on an appropriate scale, acceptable, and under community culture. Another strength was the calculation of the McDonald's Omega coefficient, which makes up for the shortcomings of Cronbach's alpha. However, the penultimate strength of this study is showing that PIH, as a generic instrument independent of language and culture, is a valid and practical tool applicable to the self-management of some chronic diseases and conditions. This makes clinical sense since many chronic conditions are co-morbid in the same patient, and that self-management behaviors most likely apply to all these conditions for that individual. An assessment of self-management is the initial step in creating a comprehensive care plan for the person's self-management knowledge, behaviors, strengths, and barriers developed in the Flinders Program [25].

5. Conclusion

The study results showed that PIH-FA can operate as a valid and reliable tool for the purpose of determining the self-management in Iranian patients affected by the chronic disease (MS, diabetes, and LBP), and could be employed as a useful tool for accurately assessing and measuring self-management in the patients of these chronic diseases in later research.

This study has several noteworthy limitations. Firstly, the sample size was comprised of a relatively small number of participants. Despite the size, meeting the minimum requirements as indicated by MacCallum et al. [26], a large sample, including subjects with different chronic diseases, would provide a more valid and reliable result. Second, the prevalence of the COVID-19 pandemic at the time of this study, especially in the retest phase, made access to participants difficult. As such several retests were carried out over the phone, which might have impacted the study result because of the scale's self-report nature.

Ethical Considerations

Compliance with ethical guidelines

Funding

Authors' contributions

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

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