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VALIDATION STUDIES

Psychometric properties of the Chinese version of Arthritis Self-Efficacy Scale-8 (ASES-8) in a rheumatoid arthritis population

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Abstract The Arthritis Self-Efficacy Scale-8 (ASES-8) is a valid tool to measure patients' arthritis-specific self-efficacy. However, evidence about reliability and validity of the ASES-8 in Chinese arthritis patients is lacking. This study aimed to culturally adapt and test the psychometric properties of the Chinese version of the ASES-8. Chinese ASES-8 was translated from original English version using translation and back-translation procedures. Validation survey was then conducted in a university-affiliated hospital by a set of questionnaires comprised Chinese ASES-8, pain-VAS, The Hospital Anxiety and Depression Scale (HADS), Functional Assessment of Chronic Illness Therapy Fatigue (FACIT-F), and Short Form 36-Item Health Survey (SF-36) physical functioning subscale. A convenience sample of 134 patients with rheumatoid arthritis was recruited from the department of rheumatology. Validity was assessed by Pearson's correlation analysis and exploratory factor analysis. Reliability was assessed using the intra-class correlation coefficient (ICC) and Cronbach's alpha. Exploratory factor analysis extracted one dimension that explained of the 71.35% variation. Significant negative correlations were found between the ASES-8 and pain-VAS, HADS-D, HADS-A scores (r −0.487 to −0.656, $p<0.01$), while positive correlations were found between the ASES-8 and SF-36 PH ($r=0.561$, $p<0.01$), FACIT-F ($r=0.660$, $p<0.01$). Excellent test–retest reliability (ICC = 0.98) and internal consistency (Cronbach's alpha = 0.942) were demonstrated. The Chinese version of the ASES-8 had statistically acceptable levels of reliability and validity for assessing self-efficacy in patients with rheumatoid arthritis. This disease-specific scale is particularly valuable for use among patients with rheumatoid arthritis from the Chinese population.

Keywords Rheumatoid arthritis · Self-efficacy · Reliability · Validity

Introduction

Rheumatoid arthritis (RA) is an inflammatory autoimmune disease with prevalence rates of 0.2–0.34% in China and approximately 0.5% of the adult population worldwide [1]. Patients living with RA often experience daily symptoms, such as joint pain and stiffness, fatigue, and functional limitations, which can result in progressive and irreversible joint damage and disability in the disease process [2]. Consequently, RA has a negative effect on individuals' physical, mental, and social well-being and thus can cause the loss of the quality of life [3].

Self-efficacy refers to the confidence that a person can perform a specific task [4], which is seen as a significant predictor within the self-management patient education programs for RA. Previous studies have shown that self-efficacy is associated with physical disease-related variables [5], psychological distress [6], medication adherence [7], and social support [8]. Although interventions, such as health education and cognitive-behavioral therapy aimed at enhancing self-efficacy, are now widely recognized

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as effective treatments to improve the quality of life for patients with RA, such interventions are seldom provided in mainland China [9]. Besides, patients with RA in mainland China manage their disease depend mostly on drugs which can relieve symptoms because of the limitation of knowledge about the illness and self-care.

As part of the Stanford Arthritis Self-Management Study, the Arthritis Self-Efficacy Scale (ASES) was developed to measure patients' arthritis-specific self-efficacy [10] and is commonly used [11]. The full 20-item ASES includes three subscales: pain, function, and other symptoms, which is well documented, including high internal consistency, test–retest reliability, and validity [10]. A short version, an eight-item scale, was developed by the same authors, including two items from the pain subscale, four items from the other symptoms subscales, and two new items that relate to keeping pain and fatigue from interfering with things the patients want to do. The ASES-8 had been shown to have good validity and reliability which were documented for English [12], Spanish [13], and German [14].

Although the ASES Short form has been widely used in evaluations of self-management education programs, physical activity interventions, and associations of self-efficacy with various health outcomes, a direct translation of the scale into other languages may limit to be used in a different cultural population. However, Instruments existed for measuring self-efficacy in patients with RA of China were the General Self-Efficacy Scale (GSES) and the Chronic Disease Self-Efficacy Scale (CDSES), which are inappropriate for use in arthritis. In addition, to our knowledge, the ASES-8 has not previously been verified for reliability and validity in people with RA of China. Given these issues, this study presents the cross-cultural adaptation of the scale and the analysis of its psychometric properties to be used in Chinese RA patients.

Methods

Translation into Chinese

A forward-back-translation procedure was performed in our study. First, two bilingual researchers who major in rheumatology translated the ASES-8 from English into Simplified Chinese. Another two bilingual professional translators translated the Chinese version back into English. Second, a bilingual expert panel consisting of a nursing professor, two nursing postgraduates, two nurses, and two doctors who worked in the rheumatology department evaluated the cultural and linguistic equivalence of each item. Third, Ten patients with RA who had different education levels were invited to review the Chinese version, and a modification was made according to the patients' feedback and understanding. Finally, we achieved the Chinese version of ASES-8 after an agreement was reached in terms of its wording, clarity, and cultural equivalence. All participants understood the items easily and took 5 min at most to complete the scale.

Validation survey

This cross-sectional study was carried out in a university-affiliated hospital, which is the largest comprehensive medical center in Tianjin from November 2015 to May 2016. 134 patients with RA were recruited utilizing a convenience sample. The inclusion criteria were: over 18 years, able to communicate in Chinese. Patients with cognitive impairment or current severe diseases, such as cancer and stroke, were excluded. The data were collected by a set of questionnaires. (1) Demographic and disease-related variables: socio-demographic information, and disease characteristics were collected using a patient demographic information form which consisted of questions about the patients' age, gender, residence, employment status, education level (Primary school or below, Junior high school, High school or above), and disease duration. In addition, a 10-cm Visual Analog Scale (VAS) was used to evaluate pain of participants in which 0 represents no pain and ten severe pain. (2) Arthritis self-efficacy: the eight-item Arthritis Self-Efficacy Scale (ASES-8), which is based on the original 20-item version, was used to measure participant's confidence on a scale of 1 (very uncertain) to 10 (very certain) in their ability to deal with symptoms of arthritis. The score for the scale was the mean of the eight items, and higher scores indicated higher self-efficacy. (3) Anxiety and depression: the Hospital Anxiety and Depression Scale (HADS) was used to measure mood disorders. It includes 14 items grouped into depression and anxiety subscales, respectively [15]. Each subscale is composed of seven items, and each item is scored from 0 to 3 with total scores ranging from 0 to 21. The Chinese version of the HADS is widely used in Chinese clinical populations with good validity and reliability [16]. (4) Fatigue: the Functional Assessment of Chronic Illness Therapy Fatigue (FACIT-F) was used to measure patient's fatigue, which is a unidimensional, 13-item, 5-point intensity rating scale. The total score ranges from 0 to 52, with a lower total score indicating greater levels fatigue [17]. The scale has been successfully applied in a variety of clinical populations. In addition, it showed excellent psychometric properties in patients with RA [18]. The Chinese version of the FACIT-F demonstrated acceptable validity and reliability of maintenance dialysis patients [19]. (5) General functional status: general functional status was measured using the physical functioning (PF) subscale of Short Form 36-Item Health

Survey (SF-36). The PF subscale contains ten items, each having three response options: limited a lot, limited a little, and not limited at all. Scores for the SF-36 PF scale range between 0 and 100, with higher scores indicating a better health status. It is an important instrument of general physical function relevant to the RA [20].

Two qualified researchers distribute the questionnaires to the eligible participants who were informed about the purpose of this study and signed informed consent. All participants completed the questionnaires at the time of enrollment, and 20 participants were randomly selected and completed the Chinese version of ASES-8 again 1 week later (for test–retest reliability).

Statistical analysis

SPSS, version 17.0 (SPSS, Inc., Chicago, IL, USA) was used to perform data analysis. Descriptive statistics were used to summarize the demographic characteristics of the participants. The construct validity was assessed by testing associations between ASES-8 and SF-36 PF, HADS, FACIT-F, and pain-VAS scores. Pearson correlation coefficient was used and categorized as follows: 0.0–0.2 indicates a very weak relationship, 0.2–0.4 means weak, 0.4–0.6 means moderate, 0.6–0.8 means strong, and 0.8–1.0 means very strong [21]. We hypothesized that the ASES-8 were negatively correlated with HADS and pain-VAS and positively correlated with SF-36 PF and FACIT-F. Exploratory factor analysis was also used to examine the construct validity of the scale. A loading factor of >0.4 was the cut-off point for item retention [22]. The Kaiser–Meyer–Olkin (KMO) values and Bartlett's test Sphericity were performed before factor analysis. The test and retest reliability was examined by calculating the intra-class correlation coefficient (ICC) score which greater than 0.75 indicate excellent reliability [23]. Internal consistency of the scale was established by calculating the Cronbach's alpha. A value more than 0.7 was considered an acceptable internal consistency [24].

Results

Translation and adaptation of ASES-8

During the translation and cross-cultural adaptation phase of the study, we did not encounter any problem in translating the questions and find any conceptual or cultural difference. Therefore, we did not do any change for any item. In addition, the Chinese ASES-8 could be clearly understood and easily administered to the patients with RA. Hence, it was used in the subsequent validation study without any further adaptation or modification.

Sample characteristics

The study recruited 134 participants with RA, most of whom were women (75.4%), had received junior or less than junior high school education (82.1%). Ages ranged from 28 to 80 (mean 58.5; SD 11.9) years. Sample characteristics are shown in Table 1.

Validity

A Kaiser–Meyer–Olkin value of 0.901 and Bartlett Spherical test was significant at <0.001 in an exploratory factor analysis, indicating that the factor analysis was feasible. The results showed that all the eight items were found to load on a single factor for the full sample, and totally explained 71.35% of the variance. Factor loadings for each item were ranged from 0.768 to 0.907 (Table 2). ASES-8 scores showed moderate correlations with HADS-D ($r=-0.583$, $p<0.01$), SF-36 PH ($r=0.561$, $p<0.01$), and pain-VAS ($r=-0.487$, $p<0.01$). In addition, the correlations between FACIT-F, HADS-A, and ASES-8 were strong, $r=0.660$ ($p<0.01$) and $r=-0.656$ ($p<0.01$), respectively.

Reliability

The Cronbach's alpha coefficient was 0.942, indicating high internal consistency. The corrected item-total correlation ranged between 0.706 and 0.871. The Alpha value remained high (0.929–0.940) if single items were deleted (Table 2). The ICC value of the ASES-8 scale was 0.98 showed that test–retest reliability at 1 week apart was very satisfactory.

Discussion

The consequences of rheumatoid arthritis not only impair the quality of life for patients, but also place a huge financial burden to the country and society. Programs on self-management of diseases have become more and more popular in recent years. In consensus recommendations for the management of RA, the aims of self-management are to improve the patient's self-management ability, maintain physical function, and promote social participation [25]. Self-efficacy is important for patients with RA who are expected to undertake self-management activities; in addition, it is a common index for evaluating the effectiveness of health education interventions. To our knowledge, this is the first study to evaluate the psychometric properties of the Chinese version of ASES-8, an arthritis-specific tool that has less burdensome for subjects compared to the original 20-item ASES. Our results demonstrated that the

Table 1 Sample characteristics ($n = 134$)

Characteristic	Number	Percent	Mean (SD)/median (Q1–Q3)	Range
Age (years)	134		58.5 (11.9)	28–80
Gender				
Men	33	24.6		
Women	101	75.4		
Residence				
Urban	114	85.1		
Rural	20	14.9		
Education level				
Primary school or below	24	17.9		
Junior high school	50	37.3		
High school or above	60	44.8		
Employment status				
Employed	25	18.7		
Unemployed	109	81.3		
Medical insurance				
Yes	121	90.3		
No	13	9.7		
Disease Duration (years)	134		4 (1–10)	0.25–40
Self-efficacy (ASES-8)	134		3.7 (2.1)	1–9
Pain (10 cm VAS)	134		5.1 (2.3)	1–9
Anxiety (HADS-A)	134		6.9 (4.0)	0–18
Depression (HADS-D)	134		6.9 (4.9)	0–20
Fatigue (FACIT-F)	134		28.7 (12.9)	0–52
General functional status (SF-36 PH)	134		47.1 (32.6)	0–100

Q quartile, *ASES-8* arthritis self-efficacy scale-8, *VAS* visual analog scale, *HADS* hospital anxiety and depression scale, *HADS-A* HADS anxiety, *HADS-D* HADS depression, *FACIT-F* functional assessment of chronic illness therapy fatigue, *SF-36 PH* short form 36 physical functioning

Table 2 Factor loadings and item performance of the ASES-8

Item no.	Item	Factor loading	Corrected item-total correlation	Cronbach's alpha if item deleted
1	How certain are you that you can decrease your pain quite a bit?	0.795	0.730	0.938
2	How certain are you that you can keep your arthritis or fibromyalgia pain from interfering with your sleep?	0.874	0.826	0.932
3	How certain are you that you can keep your arthritis or fibromyalgia pain from interfering with the things you want to do?	0.844	0.790	0.934
4	How certain are you that you can regulate your activity so as to be active without aggravating your arthritis or fibromyalgia?	0.875	0.830	0.932
5	How certain are you that you can keep the fatigue caused by your arthritis or fibromyalgia from interfering with the things you want to do?	0.768	0.706	0.940
6	How certain are you that you can do something to help yourself feel better if you are feeling blue?	0.848	0.798	0.934
7	As compared with other people with arthritis or fibromyalgia like yours, how certain are you that you can manage pain during your daily activities?	0.838	0.787	0.935
8	How certain are you that you can deal with the frustration of arthritis or fibromyalgia?	0.907	0.871	0.929

scale is a valid and reliable measure for assessing arthritis self-efficacy.

The result of the exploratory factor analysis suggests that the Chinese version of the ASES-8 comprised a one-factor structure, which was similar to those of the English [12] and German versions [14]. Factor loadings for each item were ranged from 0.768 to 0.907 showed that they were adequate indicators of the one single factor. No item is considered problematic and the factor explained 71.35% of the variance. Pain, depression, and anxiety were negatively and significantly related to ASES-8 scores, while physical function and fatigue were positively and significantly associated with ASES-8 scores. These results are in line with the previous studies that arthritis self-efficacy is related to and predictive of meaningful physical and psychological health outcomes [11].

The ICC value of the ASES-8 was high in this study, indicating that the scale is stable with good stability on repeated administration. The internal consistency was satisfactory (Cronbach's alpha = 0.942), and the results were comparable to those reported in the English version (Cronbach's alpha = 0.89). Further examination of the item to total correlations showed that Cronbach's alphas were ranged from 0.706 to 0.871, which indicated that individual items fit the whole scale and measure the same trait [26]. A step-by-step analysis of the item found that deleting any item could reduce the Cronbach's alpha coefficient, which illustrated that all items were conforming to the overall conceptual framework of the instrument [27].

Several limitations need to be addressed in this study. First, this was a cross-sectional study and data were obtained from a convenience sample, and further longitudinal studies from randomly selected samples may contribute to validate the sensitivity of self-efficacy to clinical variables. Second, the participants were recruited from a university-affiliated hospital. Thus, there is a possibility that most patients having a severe disease are being referred leading to lower self-efficacy in our samples. Further research is needed to assess the validity and reliability of the Chinese version of the ASES-8 in other arthritis populations receiving care in other healthcare services, so that the results can be generalized to the Chinese population.

Conclusion

In conclusion, the present study has demonstrated that the Chinese version of the ASES-8 appears to be an acceptable measure for assessing self-efficacy in patients with RA, and as a convenient and disease-specific questionnaire, it can be used in the future. This is the first study to adapt and validate an instrument that specially assesses arthritis self-efficacy in Chinese patients with RA, allowing the greater autonomy of healthcare professionals, particularly nurses, to test the effectiveness and efficacy of the self-management programs for patients with arthritis and to evaluate the patients' self-efficacy in carrying out daily activities.

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Compliance with ethical standards

Conflict of interest The authors declare no conflict of interest or any financial support.

Ethical approval The permission to adapt and evaluate the psychometric properties of the ASES-8 for Chinese culture was obtained via email from the scale's creator. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Written informed consent was obtained from all participants who were assured of confidentiality, anonymity, and right to withdraw from this study at any time.

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