

# Cross-cultural adaptation and validation of the Behcet's Disease Current Activity Form in Korea

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Received: May 21, 2014  
 Revised : July 22, 2014  
 Accepted: August 29, 2014

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**Background/Aims:** This study was undertaken to perform a cross-cultural adaptation of the Behcet's Disease Current Activity Form (BDCAF, version 2006) questionnaire to the Korean language and to evaluate its reliability and validity in a population of Korean patients with Behcet's disease (BD).

**Methods:** A cross-cultural study was conducted among patients with BD who attended our rheumatology clinic between November 2012 and March 2013. There were 11 males and 35 females in the group. The mean age of the participants was 48.5 years and the mean disease duration was 6.4 years. The first BDCAF questionnaire was completed on arrival and the second assessment was performed 20 minutes later by a different physician. The test-retest reliability was analyzed by computing  $\kappa$  statistics. Kappa scores of  $> 0.6$  indicated a good agreement. To assess the validity, we compared the total BDCAF score with the patient's/clinician's perception of disease activity and the Korean version of the Behcet's Disease Quality of Life (BDQOL).

**Results:** For the test-retest reliability, good agreements were achieved on items such as headache, oral/genital ulceration, erythema, skin pustules, arthralgia, nausea/vomiting/abdominal pain, and diarrhea with altered/frank blood per rectum. Moderate agreement was observed for eye and nervous system involvement. We achieved a fair agreement for arthritis and major vessel involvement. Significant correlations were obtained between the total BDCAF score with the BDQOL and the patient's/clinician's perception of disease activity ( $p < 0.05$ ).

**Conclusions:** The Korean version of the BDCAF is a reliable and valid instrument for measuring current disease activity in Korean BD patients.

**Keywords:** Behcet syndrome; Cross-cultural adaptation; Behcet's Disease Current Activity Form

## INTRODUCTION

Behcet's disease (BD) is a chronic, multisystemic disorder affecting the mucous membranes, skin, eyes, blood vessels, nerves, and other bodily organs [1,2]. It has proved difficult to define the disease activity in BD because of its fluctuating course, the lack of laboratory tests reflecting disease severity, and the availability of

only a few validated forms of BD activity. To evaluate BD activity, the English language questionnaire comprising the Behcet's Disease Current Activity Form (BDCAF) was first created in 1999 [3,4], and later revised (<http://www.behcet.ws>). This current study was conducted to perform a cross-cultural adaptation of the BDCAF (version 2006) to the Korean language and to evaluate its reliability and validity in Korean patients with BD.

## METHODS

### Study subjects

Patients with BD who visited our rheumatology clinic were enrolled in this study, and the data from those patients who agreed to participate were collected prospectively from November 2012 until March 2013. All patients were older than 18 years and fulfilled the criteria of the International Study Group for Behcet's Disease [5] or Chang's criteria [6]. All patients provided written informed consent for participation in this study, and the Institutional Review Board of Gachon University Gil Medical Center approved the study protocol.

### Cross-cultural adaptation

The total BDCAF score was calculated out of 12 and was given as a transformed index score on an interval scale. The questions relating to the patient's perception of disease activity over the previous 4 weeks, the patient's visual analogue scale (VAS) consisting of seven different facial expressions (on a scale of 1 to 7), and the clinician's overall perception of disease activity (scale 1 to 7), were also recorded. Cross-cultural adaptation was performed according to the guidelines proposed by Beaton et al. [7] and Guillemin et al. [8] after obtaining permission to use the BDCAF by the developer. Translation into Korean language was carried out at the Department of Rheumatology, Gachon University Gil Medical Center. The two different translators, who were aware of the objectives of the study, performed the primary translation into the Korean language. The questionnaire was then back-translated into English by two different English teachers acting as independent translators who were unaware of the study objectives. The investigators discussed the discrepancies between the translation and back-translation of the questionnaire several times before it was finalized.

### Study survey

The first BDCAF questionnaire was administered to the patient during his or her visit to the rheumatology clinic (time 1), and the second BDCAF was completed 20 minutes later (time 2). In addition, two different physicians asked the patient various questions relating to 12 items that concerned the overall perception of disease activity at time 1 and time 2. The clinician's overall perception

of disease activity was also recorded at both times. The questionnaire required approximately 5 to 10 minutes to complete. The Behcet's Disease Quality of Life (BDQOL) was developed by Gilworth et al. [9] to assess the quality of life in BD patients. Its Arabic version [10], and the Korean version by Yi et al. [11] have been validated previously. The BDQOL consists of 30 questions regarding quality of life (score range 0 to 30). We obtained permission from the developer to use the Korean version of the BDQOL. At each BDCAF assessment, the BDQOL-K was also taken.

### Statistical analysis

The agreement between the first and second assessments was evaluated by calculating the  $\kappa$  statistics. A  $\kappa$  score higher than 0.6 is considered to be a good agreement, 0.41 to 0.6 as moderate agreement, 0.21 to 0.4 as fair agreement, and below zero as poor agreement. The agreements between the BDCAF score, patient's/physician's VAS, and the BDQOL were calculated by the intra-class correlation coefficient (ICC) method. A  $p < 0.05$  was considered to indicate statistical significance. Statistical analysis was performed using SPSS version 18.0 (SPSS Inc., Chicago, IL, USA).

## RESULTS

### Clinical characteristics of patients

Forty-six patients were enrolled in this study. Seventy-six percent of the patients ( $n = 35$ ) were female. The mean age was 48.5 years, and the mean disease duration was 6.4 years. The most common patient occupation was housewife (56.5%), and 40 patients (87.0%) had a spouse. Patients had most commonly undergone between 9 and 12 years of education (39.1%) (Table 1). The mean of the patient's VAS was 3.5 at both times, and that of the physician was 3.0, which increased to 3.2 at time 2. The mean transformed BDCAF score was 6.6, which decreased to 6.2 at time 2, and the mean BDQOL score was 7.7, which also decreased to 7.0 at time 2 (Table 2).

### The test-retest reliability and validity of BDCAF

The agreement between items in the BDCAF 1 and 2 is shown in Table 3. Good agreements were achieved ( $\kappa$  scores  $> 0.6$ ) for headache, oral/genital ulceration, ery-

**Table 1. Demographic characteristics of the patients (n = 46)**

Characteristic	Value
Age, yr	48.5 ± 11.5
Sex, male: female	11:35
Disease duration, yr	6.4 ± 4.7
Occupation	
Student	2 (4.3)
Housewife	26 (56.5)
Office job	2 (4.3)
Self-employed	5 (10.9)
Education/public officer	3 (6.5)
Others	2 (4.3)
Unemployed	3 (6.5)
Marital status	
Unmarried/single	3 (6.5)
Married	40 (87.0)
Level of education, yr	
≤ 9	8 (17.4)
9 < & ≤ 12	18 (39.1)
12 < & ≤ 16	13 (28.3)
> 16	1 (2.2)

Values are presented as mean ± SD or number (%).

**Table 2. Clinical characteristics of the patients (n = 46)**

Characteristic	First assessment	Second assessment
Patient's VAS	3.5 ± 1.4	3.5 ± 1.5
Physician's VAS	3.0 ± 1.2	3.2 ± 1.6
BDCAF score (transformed)	6.6 ± 3.6	6.2 ± 3.2
BDQOL score	7.7 ± 7.5	7.0 ± 7.5

Values are presented as mean ± SD.

VAS, visual analogue scale (1 to 7); BDCAF, Behcet's Disease Current Activity Form; BDQOL, Behcet's Disease Quality of Life (0 to 30).

thema, skin pustule, arthralgia, nausea/vomiting/abdominal pain, and diarrhea with altered/frank blood per rectum. Moderate agreement was observed for eye and nervous system involvement. We obtained a fair agreement for arthritis and major vessel involvement (Table 3).

The test-retest reliability of the BDCAF score was good, with a high correlation between the two time points (ICC = 0.836,  $p < 0.001$ ). The BDCAF 1 score significantly correlated with the BDQOL (ICC = 0.478,  $p =$

**Table 3. The agreement between the first and second questionnaires of the Behcet's Disease Current Activity Form**

Variable	κ	p value
Headache	0.774	< 0.001
Oral ulceration	0.869	< 0.001
Genital ulceration	0.832	< 0.001
Erythema	0.617	< 0.001
Skin pustules	0.835	< 0.001
Joints (arthralgia)	0.781	< 0.001
Joints (arthritis)	0.355	0.014
Nausea/vomiting/ abdominal pain	0.801	< 0.001
Diarrhea with altered/frank blood per rectum	0.844	< 0.001
Eye involvement	0.427	0.003
Nervous system involvement	0.502	< 0.001
Major vessel involvement	0.330	0.022

0.016) at time 1, and the BDCAF 2 score also correlated with the patient's VAS (ICC = 0.311,  $p = 0.025$ ), physician's VAS (ICC = 0.362,  $p = 0.005$ ), and the BDQOL (ICC = 0.529,  $p = 0.007$ ) at time 2 (Table 4).

## DISCUSSION

We undertook this study to assess the cross-cultural adaptation of the revised BDCAF questionnaire in Korean patients with BD. The reliability and validity tests showed a successful adaptation of the BDCAF into the Korean language. BD presents with a heterogeneous nature of organ involvement and has a fluctuating course [1]. There is also a lack of laboratory tests that give information on the severity of the disease [1-3]. The clinical instrument for reflecting the overall disease activity for BD was designed in the United Kingdom in 1999 and subsequently revised in 2006. This BDCAF (English version) should be used for cross-cultural adaptation as an instrument for assessing disease severity within different cultures and languages.

In the present study, good agreements ( $\kappa$  scores > 0.6) were obtained in most of the items. In the original United Kingdom version [3], good agreement was also obtained for all BDCAF variables, except for the questions relating to diarrhea with altered or frank blood and new large vessel involvement. The lack of agreement for

**Table 4. The Intraclass correlation coefficient between the Behcet's Disease Current Activity Form score and other variables**

Evaluated time	Intraclass correlation coefficients		95% Confidence interval
	First BDCAF	Second BDCAF	
<b>BDCAF score</b>			
First		0.836 <sup>a</sup>	0.703 to 0.909
Second	0.836 <sup>a</sup>		0.703 to 0.909
<b>Patient's VAS</b>			
First	0.146		-0.228 to 0.449
Second		0.311 <sup>a</sup>	-0.150 to 0.604
<b>Physician's VAS</b>			
First	0.116		-0.206 to 0.403
Second		0.362 <sup>a</sup>	-0.169 to 0.661
<b>BDQOL score</b>			
First	0.478 <sup>a</sup>		0.060 to 0.711
Second		0.529 <sup>a</sup>	0.149 to 0.740

BDCAF, Behcet's Disease Current Activity Form; VAS, visual analogue scale (1 to 7); BDQOL, Behcet's Disease Quality of Life (0 to 30).

<sup>a</sup> $p < 0.05$ .

bloody diarrhea in the United Kingdom version was attributed to the difficulty in determining whether or not this symptom relates to mucosal inflammation, when based only on the information gained from the clinical history. On the other hand, in the Turkish version of the BDCAF, good interobserver agreement was obtained for these two items involving gastrointestinal symptoms [12]. In our study, we had good agreements for nausea/vomiting/abdominal pain and diarrhea with altered/frank blood per rectums.

Our study demonstrated moderate agreement for eye and nervous system involvement. A similar result for eye involvement was reported in the Brazilian study [13]. For a proper assessment of eye involvement in BD, cooperation with ophthalmologists should be arranged. We had fair agreement for arthritis and major vessel involvement. However, these questions might be limited by the information gained from history-taking alone. The small number of patients in our study could also affect the results, as in a previous report [13]. For example, only two patients were found to have major vessel involvement by both physicians. There were significantly positive correlations between the total BDCAF scores and the BDQOL at time 1, and the patient's VAS, physician's VAS, and the BDQOL at time 2, which therefore represent the reliability and reproducibility of our study.

In conclusion, the cross-cultural adaptation of the BDCAF questionnaire for use in Korea was successful. The Korean version of the BDCAF is a reliable and valid instrument for measuring current disease activity in BD patients, especially for the items relating to headache, mucocutaneous, musculoskeletal, and gastrointestinal involvements. The Korean version of the BDCAF can be used in Korean patients as a simple instrument for assessing clinical BD activity.

#### KEY MESSAGE

1. Cross-cultural adaptation of the Behcet's Disease Current Activity Form (BDCAF) questionnaire for use in Korea was performed.
2. There were good agreements and correlations between the BDCAF score and the Behcet's Disease Quality of Life score, and the patient's/clinician's perception of disease activity in the Korean version of the BDCAF.
3. This a reliable and valid instrument for measuring current disease activity in Behcet's disease patients.

**Conflict of interest**

No potential conflict of interest relevant to this article was reported.

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