

Validity and Reliability Test of The Indonesian Version for Diabetes Quality of Life - Brief Clinical Inventory

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Abstract

Objective: To test the validity and reliability of the Indonesian version of diabetes quality of life-brief clinical inventory (DQoL-BCI).

Methods: A cross-cultural adaptation was performed using forward and backward translation. Validity and reliability tests were conducted at Public Health Center (PHC) in Yogyakarta with 75 adult type 2 diabetes (T2D) patients. Content validity and construct validity were conducted. The reliability test was assessed by internal consistency.

Results: The average age was 60years and most respondents were female with high school education and unemployment. The results showed content validity index (CVI) score were 0.80-1.00 and 0.90 for item and scale, respectively. The correlation among items indicated moderate association ($r = 0.255-0.581$). The EFA resulted in the KMO 0.633, Bartlett test 310.604, $p = 0.000$, and total variance of explained QoL was 64.22%. Cronbach alpha of the Indonesian version of DQoL-BCI was 0.735, indicated adequate result.

Conclusion: The Indonesian version of DQoL-BCI is a reliable and valid instrument to assess health related quality of life on T2D patients.

Keyword: DQoL-BCI, diabetes mellitus, validity, reliability, quality of life

Introduction

Diabetes quality of life (DQoL) is a specific and common tool to measure quality of life (QoL) among diabetic patients. Due to the illness progress, the instrument was developed in a short, but valid inventory, known as the DQoL-BCI. The questionnaire was conceptualized from several diabetes QoL instruments and made in a shorter version to minimize the filling time. The DQoL-BCI consists of 15 questions and is useful for clinical practice and research¹.

The DQoL-BCI is available in several languages such as Malaysian², Iranian³, Polish⁴ and Greec⁵, but it is not available in Indonesia. Before the application in specific diabetes patients, the instrument should be tested for validity and reliability. A psychometric testing is essential during development or adopting an instrument⁶. Only a valid and reliable tool can guarantee an appropriate and trustable outcomes⁷. To our best knowledge, there is no a cross-cultural adaptation study of DQoL-BCI in Indonesia. Therefore, a methodological study is required to check the validity and reliability of the DQoL-BCI in Indonesian version. The purpose of this study was to identify the validity and reliability indicators of the Indonesian version of DQoL-BCI on diabetic patients.

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Methods

Design and samples

A quantitative research using cross-sectional design was conducted between August-September 2018. Adult T2D patients were invited to participate using consecutive sampling technique. The included criteria were native Indonesian and agreed to join a study. Meanwhile, the T2DP who had mental problems were excluded.

The minimum samples for the cross-cultural study was at least five participants in each item⁸. There are 15 items in DQoL-BCI and then researchers require a total of 75 participants for validity and reliability testing.

Measurement

The DQoL-BCI was developed by Burroughs et al.¹ to assess the QoL in patients with T1D and T2D. The researchers provided an approval for translation from the original authors⁹. The DQoL-BCI consists of 15 questions. Each item in the DQoL-BCI has a 5-point Likert's scale (1=Very Dissatisfied/All the Time, 2=Moderately Dissatisfied/Often, 3=Neither/Sometimes, 4=Moderately Satisfied/Very Seldom, 5=Very Satisfied/ Never). For sake of analysis, a minimum of two-third (10 out of 15) of total items should be completed¹. The final score of the DQoL-BCI was obtained by calculating the average score of total items. The possible range is between 1 and 5, in which number 1 shows the lowest QoL of diabetic patients and number 5 shows the highest QoL. The higher number of obtained values indicates a better QoL^{1,9}.

Procedures for data collection

A cross-cultural adaptation process was applied using a guideline of Beaton et al.¹⁰ which consists of 5 stages; forward translation, synthesis, backward translation, expert review, pilot testing and validity/reliability test. First, the DQoL-BCI was independently forward translated into Indonesian version by two bilingual (English-Indonesian) speakers. Secondly, the researchers synthesized forward translation results. Next, two English native speakers who understand Indonesian, back translated questionnaire into English version. Five multidisciplinary experts on diabetes, consisting two internal medicine nurses, consultant endocrinologist,

dieticians, and nursing faculty, reviewed the Indonesian and original version. A content analysis recommends inviting three to ten multidisciplinary experts in a panel¹¹. The procedure of evaluating the content validity to gain CVI for scale and item was similar with previous study^{12,13}. The outcome of expert review was then piloted to 10 T2D patients in one PHC in Yogyakarta to check readability and estimated time for accomplishment.

The final version of Indonesian DQoL-BCI was administered in two PHC units to test construct validity and internal consistency. The nurse in charge provided a list of T2D patients who participated in diabetes meeting-known as *Prolanis*. All T2D patients were screening using inclusion/exclusion criteria and eligible patients received research information. Then, they were requested to sign if they agree to join the study. Researchers provided a time for participants to self fill-in the questionnaire and directly returned in a closed envelop after completion.

Data Analysis

An IBM SPSS for Windows version 15.0 was used to test validity and reliability. Researchers tested the content and construct validity and internal consistency for reliability test. Item and scale CVI were identify adequate when the outcome indicated ≥ 0.80 and ≥ 0.90 , respectively, for less than 6 experts in expert judgment^{11,13}. The construct validity used Pearson product moment test and the exploratory factor analysis (EFA). The results of Pearson test were compared with *r* table to indicate the valid/non-valid items¹⁴. The EFA was applied using the principal component analysis (PCA) with Varimax rotation as following the construct of instrument. The Keiser-Meyer-Olkin (KMO) and Bartlett test were assessed and only factor loading ≥ 0.32 was proceeded¹². Internal consistency using Cronbach's Alpha coefficient was used to indicate reliable questionnaire. Alpha coefficient ≥ 0.70 indicates acceptable internal consistency¹¹⁻¹³.

Results

A total of 75 participants in this study and the characteristics were mostly females (65.3%), with senior high school or above education (53.4%), unemployed (61.3%), and the average age was 60 (± 8.46) years.

The items CVI resulted a range between 0.80-1.00 and the scale CVI was 0.90. The experts suggested modifying the sequence of questions regarding the type of responses. We modified the original question order to Indonesian DQoL-BCI (#3→#10, #4→#11, #5→#3, #6→#4, #7→#12, #8→#5, #10→#13, #11→#6, #12→#14, #13→#15, #14→#7, #15→#8, item no #1, #2, and #9 were in the same order). The first eight questions used responses of very satisfied, satisfied and soon while the rest items used never, very seldom etc.

for the responses.

Moreover, the expert advised to provide an explanation and examples for several items (1, 2, 4, 5, 6, 7, 13, and 14) of Indonesian DQoL-BCI beside the original question to avoid confusedness during completing the questionnaire because it was self-reported questionnaire (Table 1). The pilot testing on 10 respondents indicated that they all agreed that the instrument was easy to understand and required an 11 minutes to complete.

Table 1. Further explanation and examples of Indonesian version of DQoL-BCI

No	Explanation and examples
#1	Diabetes treatment includes physical activity, diabetes education, medication, smoking cessation, avoiding alcohol, maintaining a diet and monitoring blood sugar.
#2	To manage diabetes, it is required proper diabetes management. This activities can be carried out in PHC, NCD community services or the nearest health care facilities.
#4	Exercise should accomplish for at least 150 minutes/week with moderate intensity i.e. cycling, jogging, walking, brisk walking or aerobic.
#5	Diabetes can cause sexual problems. Male diabetes patients could have erectile dysfunction and premature ejaculation while females have problems on unstable sexual mood, orgasm, and itching in genital area.
#6	Diabetes treatment can be a family burden. It includes more time, energy, costs, thoughts and feelings related to diabetes management.
#7	Diabetes checkups include blood sugar monitoring, regular, foot, eyes examinations and others.
#13	Pain related to diabetes treatment is resulted by insulin injection, collecting blood samples, and diabetic wound care.
#14	Physically ill includes pain, heat, fever, tingling, body discomfort due to treatment and management of diabetes

The r table was determined as 0.227 and the outcome of Pearson test showed $r = 0.255-0.581$, indicated greater results if it compared with the r table. The EFA result in the KMO 0.633, Bartlett test 310.604, and $p = 0.000$. Total variance of explained QoL was 64.22% (Table 2).

Table 2. Factor loading of Indonesian version of DQoL-BCI

Item	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
Loading	0.58	0.71	0.68	0.54	0.58	0.72	0.72	0.53	0.67	0.63	0.43	0.74	0.69	0.67	0.72
AIC	0.62	0.79	0.60	0.59	0.75	0.61	0.68	0.72	0.61	0.50	0.53	0.70	0.46	0.70	0.53
Total cumulative variance for extraction sum of squared loadings													64.22%		
Total cumulative variance for rotation sum of squared loadings													64.22%		

AIC=anti-image correlation

The Cronbach Alpha coefficient for the Indonesian DQoL-BCI was 0.735. The correlation for inter-item and item-total were -0.233 to 0.578 and 0.124 to 0.463.

Discussion

This study highlights the validity and reliability outcomes of the Indonesian version of DQoL-BCI. Our study finding indicated the acceptable outcome of psychometric testing for Indonesian version of DQoL-BCI among Indonesian T2D patients. The findings of CVI for Indonesian version of DQoL-BCI were similar with Iranian³ and Greek version⁵. In Iranian version, the review of six experts resulted item CVI value in the range of 0.78-0.94, scale CVI of 0.84, and content validity ratio (CVR) of 1.008³. On the other hands, the Greek version of DQoL-BCI indicated that item CVI scores were between 0.73 and 1.00, scale CVI was 0.87 and CVR was 1.007 after five diabetes expert review⁵.

The pilot testing on 10 diabetic patients showed a full agreement that the Indonesian version of DQoL-BCI is understandable and required an average of 11 minutes for filling all items. The full agreement was achieve because the DQoL-BCI was added by addendum and

the example for specific terminology (i.e. diabetes pain due to insulin injection, collecting blood samples, and diabetic wound care). Then, there was no question among the 10 respondents in pilot phase. The filling time on Indonesian version of DQoL-BCI was quite similar with the Malaysian² and Iranian version³, in which they required 10-15 minutes to complete the questionnaire. It is relatively short time in filling a full questionnaire and makes the DQoL-BCI applicable in clinical settings as well as research purpose^{1,9}.

The EFA results of the Indonesian version of DQoL-BCI showed acceptable outcomes with explained variance of 64.22%. It is unsurprisingly because the previous methodological studies in Iranian³ and Greek⁵ diabetes patients indicate the similar trend. The Iranian version of DQoL-BCI showed higher KMO value (0.712) and resulted the three factors. This version of DQoL-BCI also confirmed that there were three construct factors in DQoL-BCI; (a) diabetes complication, (b) therapy, follow up, and diagnosis, and (c) psychosocial effect of diabetes, and indicated adequacy results of the three constructed factors³. The three construct factors were also found in the Greek version of DQoL-BCI with

the total explained variance was 82.7%. This version of DQoL-BCI indicated relatively higher variance of QoL among diabetic patients if it was compared with the Indonesian version of DQoL-BCI. The factors loading in the Greek version were between 0.352 and 0.944⁵. In our study, we identify a moderate loading factors among the items (0.43-0.74) and all items showed greater numbers than the standard of loading factor (0.32) in EFA¹².

The internal consistency outcome of the Indonesian version of the DQoL-BCI instrument was 0.735. It showed that this instrument was consistent and reliable for measuring the quality of life in people with T2D with an acceptable result. The results of the alpha coefficient in this study was relatively lower, but acceptable¹¹⁻¹³, than the original version which had an alpha 0.855. The outcome of alpha coefficient in Indonesian version of DQoL-BCI was quite closer with other version of DQoL-BCI questionnaires. The Malaysian, Iranian, Polish, and Greek version indicated coefficient alpha were 0.703², 0.758³, 0.761⁴, and 0.957⁵, respectively. All the versions showed the reliable outcome of the DQoL-BCI after conducting a cross-cultural adaptation process.

Conclusion

The Indonesian version of the DQoL-BCI is reliable and valid tool for assessing the QoL of Indonesian T2D patients. Further methodological research should be conducted among T1D patients. Researchers, nurses and other health workers can utilize the tool in measuring health related QoL for diabetic patients.

Conflict of Interest: None

Funding: The faculty of Medicine, Public Health, and Nursing, UGM, provided a grant for young research project in 2018.

Acknowledgements: The authors would acknowledge all T2D patients who joined this study and the nurses in PHC for facilitating the data collection process.

Ethic Statement: This study received approval from the institutional review board of UGM.

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