Journal of Multidisciplinary Healthcare

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ORIGINAL RESEARCH

Translation, Validation, and Psychometric Evaluation of the Diabetes Quality-of-Life Brief Clinical Inventory: The Urdu Version

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Purpose: The study is aimed to examine the psychometric properties of the Urdu version of the Diabetes Quality-of-Life Brief Clinical Inventory.

Methods: We adopted the forward–backward procedure to translate the Diabetes Quality-of-Life Brief Clinical Inventory (DQoL-BCI) into the Urdu language (lingua franca of Pakistan). The intraclass correlation (ICC) confirmed the consistency of retaining the items, and Cronbach's alpha established the test–re-test reliability. The confirmatory factor analysis (principal axis factoring extraction and oblique rotation with Kaiser normalization) validated the DQoL-BCI in Urdu.

Results: A two-time point with an interval of 2 weeks was used, and the Urdu version of DQoL-BCI was piloted accordingly. The 15-item translated version (DQoL-BCI-U) exhibited a satisfactory Cronbach's value of 0.866 (test) at week 1 and 0.850 at week 3 (re-test). Using the one-way random model with single measurements, the ICC for all 15 items exhibited coefficient values of >0.80. The Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett's Test of Sphericity revealed relationships of the data and suitability of CFA (0.899, $p<0.05$). Seven factors explaining the total variance of 69% were extracted. With acceptable communalities, all 15 items of DQoL-BCI-U were retained.

Conclusion: The study concludes that the translated version of DQoL-BCI-U is a valid instrument in regions, where Urdu is a communal language of communication and can examine quality-of-life issues during the typical patient–provider encounter.

Keywords: translation, validation, psychometric evaluation, Urdu

Introduction

Traditionally, healthcare systems around the globe were concerned with decreasing morbidity and mortality. Healthcare systems concentrated on the "quantity of life," and gave utility evaluation little consideration during disease management.[1] However, the late 1960s observed significant variations in socio-demographic profiles and their influence on the healthcare systems of "late modern" societies. These variations developed another critical concern: "Quality-of-Life" (QoL). First introduced by Elkington in 1966,[2] the author raised significant questions regarding the maintenance and improvement of QoL of an individual patient. Furthermore, the author also emphasized that there should be a specific criterion to utilize society's resources to achieve excellent health and QoL for all members of that society.[2] The contentions by Elkington were further supported by the development of new technologies that raised additional questions for clinical and non-clinical professionals. Hence, QoL was proposed as an additional yet substantial parameter for making decisions for health-related issues.[1] Consequently, researchers from both medical and social sciences started to construct instruments designed to measure QoL. These efforts developed generic and disease-specific tools focusing on the status and methods of improving the patients' physical, mental, and social well-being.[3–5] Since then, QoL measures have been in continuous use during clinical trials and research initiatives to assess the impact of management, treatment, and medical interventions.[6–9]

Received: 30 December 2021
Accepted: 28 March 2022
Published: 29 April 2022

There are multiple models of QoL, however, the models proposed by Wilson and Cleary,[10] Ferrans et al,[11] and the World Health Organization[12] are frequently used in the literature. These models can also predict multidimensional aspects of QoL, and the diverse use of this term across health and disease conditions.[13] Based on the postulates of these models, both generic and disease-specific instruments are developed and are repeatedly used in literature to assess the literature QoL and its related issues.[13] Within this context, the differences between the generic and the disease-specific QoL measures are extensively discussed in the literature.[14,15] Where generic measures focus on various health conditions, disease-specific measures tend to measure specific elements of a disease and are sensitive to changes and modifications during pharmacotherapy and disease-related management.[16] Furthermore, disease-specific measures can give a detailed pattern of specific symptoms and impairment related to a particular disease.[17] Therefore, disease-specific measures are much more effective at assessing the impact of disease-based interventions and identifying critical issues in making clinical care decisions.

In line with what is being discussed, evaluating QoL in chronic diseases such as diabetes is imperative. The management requires a long-term enduring change that impedes patients' lifestyles and day-to-day activities. Patients with diabetes are exposed to physical and psychological complications that directly influence the QoL. Even though patients with diabetes are managed according to the established guidelines, improvement in QoL is not frequently reported.[18] This is understandable as QoL is a multi-factor phenomenon, and progress in overall health status is not dependent on a single factor.[19] Our observations are supported by various studies whereby disease-related, personal, and psychosocial factors negatively affect QoL.[20–22] Therefore, to comprehensively assess the QoL in diabetes patients, an instrument capable of evaluating significant experiences of the patients is required. In literature, multiple tools are available but with certain limitations. Some tools are extensively built, others are either Type I or Type II focused. Some focus on QoL during clinical trials, while others lack generalizability because of their specific nature.[23] Several QoL measures are available that assess the QoL in T2DM. The Audit of Diabetes-Dependent QoL measure, Diabetes Health Profile, Problem Areas in Diabetes, Diabetes Impact Measurement Scales, Diabetes Quality-of-Life Clinical Trial Questionnaire, The Asian Diabetes Quality-of-Life, and Diabetes-Dependent Quality-of-Life are frequently used and reported in the literature.[24,25] Nevertheless, an instrument focusing on the live experiences of diabetes patients during the point of care was missing in the literature. These limitations led to the Diabetes Quality-of-Life Brief Clinical Inventory (DQoL-BCI); an instrument derived from the Diabetes Quality-of-Life Questionnaire (DQoL). The DQoL-BCI evaluated three domains (satisfaction, impact, and worries) that were not addressed by other QoL instruments.[23] Moreover, the DQoL-BCI targeted both Types I and II diabetes, was less time-consuming, and predicted self-care behaviors and specific treatment-related concerns. Most importantly, it identified QoL issues left unaddressed during the consultation process. Consequently, DQoL-BCI showed clear advantages over other tools while addressing issues related to QoL in patients with diabetes. Therefore, the developers concluded that, while addressing QoL in diabetes patients, DQoL-BCI can replace other generic instruments.[23]

In this study, we aimed to generate a validated Urdu version of DQoL-BCI and examined its psychometric properties to be used for patients with diabetes. We believe that a psychometrically valid diabetes-specific questionnaire would be most suitable for assessing the QoL during diabetes management for territories where Urdu is used as a communication medium.[26–28] In addition, it will be of critical importance to diabetes as that disease is associated with long-term complications and disabilities.

Materials and Methods

Study Design, Settings, and Pilot

We used a cross-sectional study design to test the DQoL-BCI psychometrically. The study was conducted at the Sandeman Provisional Hospital Quetta (SPHQ). Established in 1939, SPHQ is a tertiary care teaching hospital located in the city's center. With well-developed and equipped wards, SPHQ has the complete facility and advanced technologies to manage patients with T2DM.[29]

Thirty patients with T2DM attending medicine wards of SPHQ for their routine consultation were approached for the pilot phase. In addition to the face and content validity, the pilot study was conducted to establish the internal consistency

of DQoL-BCI-U. Respondents' views on the translated instrument were considered and were discussed in a second expert panel discussion (post-pilot). One hundred and sixty-five patients were later enrolled for the field study.

Study Participants and Criteria

Patients with T2DM, consenting to participate with an understanding of long-term collaboration (for test–re-test analysis) and familiar (speaking, reading, and writing) with the national language of Pakistan (Urdu) were approached for data collection. We excluded illiterates, patients with mental impairments, patients requiring assistance in responding to the principal investigator, and immigrants.

Permission to Translate and Validate the DQoL-BCI

We sent a formal request to the developer of DQoL-BCI (Prof. Dr. Tom Burroughs, SLU College for Public Health and Social Justice, 3545 Lafayette Avenue, St. Louis, MO 63104, USA), who provided the English version of the DQoL-BCI and permission through email.

Translation of the DQoL-BCI

The translation of DQoL-BCI followed the forward–backward procedure that is proposed by the guidelines issued by the International Society of Pharmacoeconomics and Outcomes Research and World Health Organization.[30,31]

Forward Translation of DQoL-BCI (English to Urdu)

The research team approached four independent linguistic translators (native of Urdu language with academic proficiency in the English language). All translators were blinded because we wanted the Urdu version of DQoL-BCI to be theoretically to the DQol-BCI. Furthermore, our focus was to avoid discrepancies and partiality in the translation process and assure that the translated version received by the translators was without any communal discussion.

Reverse Translation of DQoL-BCI (Urdu to English)

Four independent translators (native English language with academic proficiency in the Urdu language) performed the reverse translation. As discussed above, the translators were also blinded. Once the research team received the two translated versions, we conducted an expert panel discussion (pre-pilot) to discuss issues associated with the questionnaire translation process.

Expert Panel Discussion (Pre-Pilot)

A bilingual (English and Urdu) expert panel convened by the research supervisor discussed the two translated versions of the questionnaire. The panel members comprised the translators, the research team, two diabetologists, and three experienced scientists of Health System Research. After reaching a mutual consensus, the Urdu version of DQoL-BCI, termed "The Diabetes Quality-of-Life Brief Clinical Inventory-Urdu (DQoL-BCI-U)," was subjected to a pilot study.

Expert Panel Discussion (Post-Pilot)

The DQoL-BCI-U, along with the reservations and recommendations of the patients, was discussed in the post-pilot expert panel discussion. The DQoL-BCI-U required minor changes, and the updated version was again presented to respondents of the pilot study for their consideration. Once the panel-respondents understanding was established, the finalized version of DQoL-BCI-U was made available for the field study (Supplementary Material).

Sampling for Pilot Phase (Test–Re-Test at Two Different Points)

According to Cohen,[32] the population correlation coefficient as the effect size measurement should be used to benchmark sample size calculation. As described in the literature ($p<0.05$ with statistical power at 80%), 30 respondents were contacted for test–re-test analysis.[33]

Sampling for Factor Analysis (Field Test)

We used the Confirmatory factor analysis (CFA) to establish the construct validity.[34] Determining an acceptable sample selection for CFA is essential because an inadequate sample may lead to problems with an estimation and item interpretation.[33,34] Therefore, as suggested by Wolf et al,[35] a 10 subjects to 1 variable ratio were used to determine the sample for CFA. One hundred and fifty participants were needed and, by adding a drop-out of 10%, the final sample size was 165, which was supposed to generate a good factor resolution.[34]

Ethical Approval

We conduct this study in compliance with the principles of the Declaration of Helsinki. The Institutional Review Board at the Faculty of Pharmacy and Health Sciences, University of Balochistan approved the study (UoB/Reg/67). Permission from the Medical Superintendent of SPHQ was also taken into consideration. Written consent from the participants was taken, and they were informed about their rights of participation in the study.

Statistical Analysis

The data were coded and entered in SPSS v 21.0 with an alpha value of 0.05 (two-tailed).[36] Frequencies and percentages were used to explain the demographic variables. The test–re-test reliability was assessed and interpreted through Cronbach's alpha reliability analysis.[34] Intraclass Correlation Coefficient (ICC) via the One-Way Random effects model with single measures was used to establish the stability of the items.[34–37] Confirmatory Factor Analysis confirmed the validity of the DQoL-BCI-U through principal axis factoring extraction and Oblique rotation with Kaiser Normalization.[34]

Results

Demographic Characteristics of the Study Respondents (Pilot Phase)

The demographic information for the pilot phase is presented in Table 1. The majority (19, 63.4%) of the patients were 30–40 years old. Males dominated the cohort, and almost 50% were public employees. Nearly 40% had T2DM for less than 5 years, and 63.4% took oral hypoglycemic agents.

Reliability Analysis (Two-Time Point)

The DQoL-BCI-U was pilot tested on 30 respondents at two time points with an interval of 2 weeks (Table 2). Based on what is reported in the literature,[34,38,39] the following criterion was referred; $0.9 \leq \alpha$ (excellent), $0.8 \leq \alpha < 0.9$ (good), and $0.7 \leq \alpha < 0.8$ (acceptable). At week 1, the 15-item DQoL-BCI-U exhibited an acceptable Cronbach's value of 0.866 (test). Furthermore, the DQoL-BCI-U reported a good Cronbach's value of 0.850 at week 3 (re-test) that illustrated satisfactory internal consistency at two time points.

Construct Stability Assessment

Using the One-Way Random Model (Model 1) with single measurements, the Intraclass Correlation Coefficient (ICC) was calculated to establish the stability of the items. The ICC values of <0.50 (low), 0.50–0.75 (moderate), and >0.75 (good), as suggested by Portney and Watkins,[37] were used as reference. As shown in Table 3, the ICC for all items tested for intra-rater (test–re-test) reliability was good and exhibited coefficient values of >0.80.

Description of Field Test (n=165)

The demographic characteristics of the study respondents for field testing are described in Table 4. The cohort was dominated by 41–50 years (92, 70.8%), and most of the respondents had rural locality (70, 53.7%). Thirty-six (27.6%) were illiterate, while 115 (88.4%) were married. The internal consistency using Cronbach's alpha statistics (n=165) for pooled 15 items showed well acceptable reliability at α=0.801 (Table 5).

Table 1 Patients' Characteristics and Descriptive Statistics (N=30, Pilot Test)

Characteristics	Frequency (N)	Percentage (%)
Age group		
30–40	19	63.4
41–50	11	36.6
Gender		
Male	20	66.6
Female	10	33.4
Income (Pakistani Rupees)		
<20,000	24	80.0
>20,000	6	20.0
Education		
Intermediate	21	70.0
Bachelor	9	30.0
Marital status		
Married	28	93.3
Divorced	2	6.7
Residence		
Urban	18	60.0
Rural	12	4.0
Occupation		
None	10	33.4
Government employee	17	56.6
Business	3	10.0
Duration of Type 2 Diabetes Mellitus		
<5 years	13	43.3
5–10 years	7	23.3
>10 years	10	33.3
Treatment module		
OHA	19	63.4
Insulin	7	23.3
OHA+Insulin	4	13.3
Family history of Type 2 Diabetes Mellitus		
Yes	11	63.4
No	19	36.6

Abbreviation: OHA, Oral hypoglycemic agents.

Confirmatory Factor Analysis: Construct Validity

The Kaiser–Meyer–Olkin (KMO) sampling adequacy for the factor analysis was 0.899; hence was rated meritorious.[40] Also, with χ^2=1071.21 and p<0.05, Bartlett's Test of Sphericity revealed relationships of the data and suitability of CFA.[41]

The extracted communalities and loadings factors for the DQoL-BCI-U are presented in Table 6. We used both matrices (pattern and structure) to avoid probabilities of value suppression because of the factorial relationships.[42] Seven

Table 2 Reliability Values at Two-Time Points (N=30, Pilot Study)

Items in DQoL-BCI-U	Cronbach's Alpha Coefficient (Based on Standardized Items)			
	Test (Week 1) N=30	Scale When Item Deleted	Re-Test (Week 3) N=30	Scale When Item Deleted
How satisfied are you with your current diabetes treatment?	**0.866**	0.821	**0.850**	0.825
How satisfied are you with the amount of time it takes to manage your diabetes?		0.812		0.844
How often do you find that you eat something you should not rather than tell someone that you have diabetes?		0.824		0.830
How often do you worry about whether you will miss work?		0.833		0.836
How satisfied are you with the time it takes to determine your sugar level?		0.841		0.838
How satisfied are you with the time you spend exercising?		0.820		0.822
How often do you have a bad night's sleep because of diabetes?		0.817		0.841
How satisfied are you with your sex life?		0.856		0.810
How often do you feel diabetes limits your career?		0.849		0.829
How often do you have pain because of the treatment for your diabetes?		0.852		0.809
How satisfied are you with the burden your diabetes is placing on your family?		0.860		0.849
How often do you feel physically ill?		0.863		0.847
How often do you worry about whether you will pass out?		0.824		0.837
How satisfied are you with time spent getting checkups for your diabetes?		0.800		0.827
How satisfied are you with your knowledge about your diabetes?		0.833		0.826

Note: Adapted with permission from Thomas E. Burroughs, PhD; Radhika Desikan, PhD; Brian M. Waterman, MPH; Debra Gilin, PhD; Janet McGill, MD. Development and Validation of the Diabetes Quality of Life Brief Clinical Inventory, https://doi.org/10.2337/diaspect.17.1.41. Copyright 2004 by the American Diabetes Association.[23]

Table 3 Reliability of Test–Re-Test (N=30; Intraclass Correlation Coefficient)

Items in DQoL-BCI-U	Intraclass Correlation Coefficient*	95% Confidence Interval	*p*-value
How satisfied are you with your current diabetes treatment?	0.801	0.828–0.911	<0.05
How satisfied are you with the amount of time it takes to manage your diabetes?	0.822	0.721–0.919	<0.05
How often do you find that you eat something you should not rather than tell someone that you have diabetes?	0.831	0.743–0.920	<0.05
How often do you worry about whether you will miss work?	0.877	0.812–0.900	<0.05
How satisfied are you with the time it takes to determine your sugar level?	0.809	0.812–0.903	<0.05
How satisfied are you with the time you spend exercising?	0.828	0.884–0.910	<0.05
How often do you have a bad night's sleep because of diabetes?	0.810	0.734–0.908	<0.05
How satisfied are you with your sex life?	0.873	0.800–0.909	<0.05
How often do you feel diabetes limits your career?	0.840	0.811–0.915	<0.05
How often do you have pain because of the treatment for your diabetes?	0.845	0.824–0.927	<0.05
How satisfied are you with the burden your diabetes is placing on your family?	0.866	0.833–0.914	<0.05
How often do you feel physically ill?	0.841	0.810–0.904	<0.05
How often do you worry about whether you will pass out?	0.840	0.817–0.900	<0.05
How satisfied are you with time spent getting checkups for your diabetes?	0.857	0.825–0.900	<0.05
How satisfied are you with your knowledge about your diabetes?	0.855	0.831–0.911	<0.05

Notes: *Intraclass correlation coefficient values using one way random effect model (Model 1), single measures, 95% confidence interval. Adapted with permission from Thomas E. Burroughs, PhD; Radhika Desikan, PhD; Brian M. Waterman, MPH; Debra Gilin, PhD; Janet McGill, MD. Development and Validation of the Diabetes Quality of Life Brief Clinical Inventory, https://doi.org/10.2337/diaspect.17.1.41. Copyright 2004 by the American Diabetes Association.[23]

factors explaining the total variance of 69% were extracted. For the retention of items, we used Field's proposal of communalities >0.30.[33] As shown in Table 6, loading values for all 15 items were acceptable (>0.40). All items of the translated DQoL-BCI-U were retained, proving the validity of the translated questionnaire.

Discussion

Diabetes is a global public health concern and is approaching epidemic proportions. The disease is a burden to the healthcare systems that adversely affect the socio-economic development of nations.[43] Four hundred and fifty-one million adults had diabetes in 2017. The International Diabetes Federation estimated a projected increase of 693 million by 2045 (IDF), provided no intervention is offered or adopted.[44] While the past decades have seen significant progress in promoting population health and extending life expectancy; diabetes still has the second biggest negative effect on reducing global health adjusted life expectancy worldwide.[45]

Within this context, diabetes is highly prevalent in developing countries, and Pakistan is no exception. The IDF in 2019 estimated that >19 million adults in Pakistan had diabetes. Alarmingly, 8.5 million of these 19 million were undiagnosed, hence are at risk of developing micro- and macrovascular complications.[46] In addition to the negative effect of diabetes on QoL, the healthcare system of Pakistan is faced with a lack of human resources, optimal facilities, income disparities, and differences of living status that further deteriorate the QoL.[22] Therefore, assessing QoL in diabetes patients becomes imperative. For that reason, we psychometrically validated the DQoL-BCI-U, which will be utilized for the assessment of QoL in the healthcare settings of Pakistan.

Table 4 Respondents' Characteristics and Descriptive Statistics (n=165, Field Test)

Characteristics	Frequency (N)	Percentage (%)
Age group		
30–40	12	7.2
41–50	92	55.8
51–60	61	37.0
Gender		
Male	77	46.7
Female	88	53.3
Income (Pakistani Rupees)*		
None	69	41.8
<20,000	43	26.1
>20,000	53	32.1
Education		
None	36	21.8
Primary	27	16.4
Secondary	72	43.6
Intermediate	30	18.1
Marital status		
Married	98	59.4
Unmarried	67	40.6
Residence		
Urban	95	57.6
Rural	70	42.4
Occupation		
None	69	41.8
Government employee	27	16.4
Business	69	41.8
Duration of Type 2 Diabetes Mellitus		
<5 years	131	79.3
>5 years	34	20.6
Treatment module		
OHA	41	24.8
Insulin	93	56.4
OHA+Insulin	31	18.7
Family history of Type 2 Diabetes Mellitus		
Yes	101	61.2
No	64	38.8

Notes: *1 Pk. Rs = 0.0057 USD, OHA,
Abbreviation: OHA, oral hypoglycemic agent.

The current study showed that the Urdu version of the questionnaire had good psychometric properties and was also coherent to the study participants. The DQoL-BCI-U demonstrated a Cronbach alpha index of 0.81 that revealed high reliability and internal consistency. Furthermore, the test–re-test reliability was also excellent, like the parent study[23] and other

Table 5 Reliability Values for All Items (N=165, Field Test)

Items in DQoL-BCI-U	Cronbach's Alpha Coefficient (Based on Standardized Items)	
	N=165	Scale When Item Deleted
How satisfied are you with your current diabetes treatment?	0.801	0.799
How satisfied are you with the amount of time it takes to manage your diabetes?		0.800
How often do you find that you eat something you should not rather than tell someone that you have diabetes?		0.817
How often do you worry about whether you will miss work?		0.787
How satisfied are you with the time it takes to determine your sugar level?		0.796
How satisfied are you with the time you spend exercising?		0.799
How often do you have a bad night's sleep because of diabetes?		0.800
How satisfied are you with your sex life?		0.804
How often do you feel diabetes limits your career?		0.797
How often do you have pain because of the treatment for your diabetes?		0.790
How satisfied are you with the burden your diabetes is placing on your family?		0.807
How often do you feel physically ill?		0.796
How often do you worry about whether you will pass out?		0.808
How satisfied are you with time spent getting checkups for your diabetes?		0.806
How satisfied are you with your knowledge about your diabetes?		0.799

Note: Adapted with permission from Thomas E. Burroughs, PhD; Radhika Desikan, PhD; Brian M. Waterman, MPH; Debra Gilin, PhD; Janet McGill, MD. Development and Validation of the Diabetes Quality of Life Brief Clinical Inventory, https://doi.org/10.2337/diaspect.17.1.41. Copyright 2004 by the American Diabetes Association.[23]

versions of the questionnaire.[47–50] Likewise, the ICC for all 15 items tested for intra-rater reliability was excellent, with significant coefficient values proposed in the literature.[33] Hence, our assessment confirmed the repeatability of item measurements between two time intervals. This also demonstrated the correlation between multiple items of DQoL-BCI-U that intended to measure the same items.

We applied the CFA to identify the underlying relationships between the measured items of DQoL-BCI-U. Before adopting the CFA, the sampling adequacy and completeness of the dataset for each variable under observation is to be established as proposed in the literature.[31] In the current study, the KMO value for the current model was 0.899, indicating the sample adequacy and data completeness for CFA.[40,51] Likewise, the positive zero-order correlations reported in our study verified that no corrective actions were needed.[52] To conclude, the acceptable values and positive correlations confirmed the application of CFA for the current data.

The construct validity was established by applying the principal factor analysis (PFA). For the PFA, the oblique rotation method with Kaiser normalization was selected based on the values extracted by the Shapiro–Wilk test as the data set violated the assumption of normality.[34] Because the delta was set at zero, direct oblimin was selected based on the assumption that factors are correlated. Results of the study reported a significant Bartlett's Test of Sphericity ($p<0.05$) which further confirmed the suitability of CFA.

Extracted communalities were used as a reference while considering the item retention. As recommended by Field[33,34] and Pallant, loading values of >0.30 have considerable influence and are to be retained during the CFA. As

Table 6 Survey Items, Rotated Factor Loading, and Communalities (n=165)

Items	Pattern Matrix							Structure Matrix							Communalities
	Component							Component							Extraction
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
1.	0.017	0.040	0.049	0.720	0.181	0.239	0.005	0.024	0.042	0.069	0.716	0.215	0.224	0.040	0.612
2.	0.218	0.050	0.746	0.012	0.115	0.136	0.167	0.202	0.074	0.735	0.007	0.099	0.213	0.225	0.675
3.	0.012	0.095	0.020	0.097	0.032	0.870	0.172	0.026	0.071	0.024	0.061	0.022	0.832	0.035	0.740
4.	0.646	0.319	0.245	0.350	0.029	0.184	0.053	0.627	0.315	0.216	0.315	0.060	0.235	0.110	0.719
5.	0.179	0.044	0.700	0.071	0.138	0.230	0.239	0.262	0.013	0.705	0.060	0.205	0.234	0.291	0.697
6.	0.050	0.066	0.025	0.072	0.005	0.201	0.894	0.015	0.007	0.026	0.047	0.063	0.059	0.850	0.776
7.	0.587	0.213	0.421	0.009	0.003	0.034	0.013	0.611	0.204	0.454	0.053	0.087	0.045	0.055	0.594
8.	0.063	0.256	0.140	0.323	0.005	0.276	0.411	0.004	0.301	0.160	0.319	0.017	0.346	0.478	0.494
9.	0.006	0.237	0.039	0.035	0.597	0.065	0.022	0.039	0.275	0.054	0.050	0.615	0.071	0.071	0.440
10.	0.064	0.761	0.002	0.021	0.047	0.045	0.133	0.061	0.765	0.002	0.036	0.019	0.011	0.185	0.610
11.	0.126	0.072	0.010	0.008	0.859	0.088	0.034	0.047	0.014	0.051	0.048	0.838	0.041	0.026	0.730
12.	0.050	0.683	0.038	0.100	0.215	0.012	0.168	0.036	0.683	0.023	0.103	0.253	0.012	0.101	0.551
13.	0.323	0.239	0.119	0.482	0.300	0.071	0.147	0.403	0.213	0.164	0.501	0.319	0.076	0.178	0.569
14.	0.058	0.192	0.045	0.558	0.101	0.443	0.202	0.067	0.215	0.004	0.567	0.075	0.501	0.262	0.644
15.	0.765	0.144	0.081	0.181	0.134	0.119	0.080	0.746	0.116	0.034	0.241	0.068	0.087	0.027	0.655

Notes: KMO=0.899, Bartlett's Test of Sphericity (p<0.05). Extraction method: principal component analysis; rotation method: oblimin with Kaiser normalization.

presented in Table 6, the extracted communalities for all items of DQoL-BCI-U ranged from 0.4–0.7, confirming that all items of the original DQoL-BCI can be adopted in the translated version. This also verified that the factors extracted during the CFA were applicable to establish the validity of DQoL-BCI-U. Likewise, items identified during the CFA were like the original DQoL-BCI and other validated versions.[23,47,50,53] Concluding, high scale reliability and good construct validity rated the Urdu version of DQoL-BCI as a reliable tool in research and individual diagnostics.

Conclusion

Assessing QoL is important while recommending or adopting preventative measures during Diabetes Mellitus. An improvement in QoL ensures the well-being of diabetic patients with a reduced frequency of complications. With satisfactory reliability (test and re-test), satisfactory correlations and acceptable communalities, all 15 items of DQoL-BCI-U were retained during the validation. Based on our analysis, we conclude that DQoL-BCI-U is a valid instrument to assess QoL in regions where Urdu is a prime language of communication. We believe that using DQoL-BCI-U will help healthcare professionals identify potential areas for improvement for diabetic patients that will affect the overall quality of care. Consequently, a large study to generalize the results and establish the QoL profile of T2DM in the country is recommended.

Strengths and Limitations

We agree with the developers of DQoL-BCI that this specific instrument should be viewed as an initial screening device to identify specific patient issues. In addition, probing other problems that patients may be facing must be kept in mind. Nevertheless, the informal communication during data collection revealed that respondents of the current study felt the

DQoL-BCI-U managed to extract their specific experiences and concerns while living with diabetes. Consequently, the DQoL-BCI-U provides an opportunity to capture patients' experiences that is not possible by adopting other instruments.

Acknowledgment

We acknowledge the patients for their help and support during the data collection process. The developers of DQoL-BCI are also acknowledged for their permission and continuous support during the study period.

Disclosure

The authors report no conflicts of interest in this work.

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