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ORIGINAL RESEARCH

Translation and Psychometric Validation of Brief Illness Perception Questionnaire: The Urdu Version for Facilitating Multidisciplinary Research in Pakistan

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Purpose: We aimed to examine and establish the psychometric properties of the Urdu version of the Brief Illness Perception Questionnaire (BIPQ) in patients with Type 2 Diabetes Mellitus.

Methods: A standard forward–backwards translation procedure was adopted. The Urdu (lingua franca of Pakistan) version of BIPQ was approved by an independent expert panel and committee review. The intraclass correlation (ICC) established the consistency of the retained items in the questionnaire. The test-retest reliability for the pilot and field study was identified by using Cronbach's coefficient. An Exploratory Factor Analysis, conducted using principal axis factoring extraction and oblique rotation with Kaiser normalization, was employed to validate the BIPQ in Urdu. The open-ended section of the BIPQ was discussed for reliability and validity through the Delphi method.

Results: The 8-item translated version (later termed the Brief Illness Perception Questionnaire in Urdu, or BIPQ-U) exhibited an acceptable Cronbach's alpha value of 0.814 (test) and 0.800 (re-test). The ICC for all eight items exhibited exceptional coefficient values of > 0.80. Internal consistency during the field study was also acceptable ($\alpha = 0.815$). The appropriateness of psychometric assessment was confirmed through the Kaiser–Meyer–Olkin measure of sampling adequacy (0.855) and Bartlett's Test of Sphericity ($p<0.05$). A statistically significant difference between females and males ($p = 0.025$) confirmed the discriminative validity through Mann–Whitney *U*-test. Based on initial eigenvalues > 1, four factors were extracted, accounting for a total variance of 75.96%. With acceptable commonalities of >0.30, all eight items of BIPQ-U were retained. Lastly, members of the Delphi group reached a mutual consensus on adding question number 9 to the validated BIPQ-U.

Conclusion: The BIPQ-U is a reliable tool for assessing illness perception among Urdu-speaking patients. It can help healthcare providers better understand patient beliefs and improve care.

Plain Language Summary: We conducted this study to develop a research instrument in Urdu (the national language of Pakistan) that can effectively assess illness perceptions. Since over 200 million people speak Urdu, primarily in Pakistan and parts of western India, an Urdu-language tool can significantly support multidisciplinary research. To achieve this, we translated and validated the widely recognized Brief Illness Perception Questionnaire (BIPQ). After obtaining formal permission from the original developer and copyright holder, we translated the BIPQ into Urdu and then back into English to ensure conceptual accuracy. We evaluated the translated version through a test-retest reliability analysis, which produced accepted results. The Intraclass Correlation Coefficient for all eight items exceeded 0.80, indicating excellent consistency. In our field study, the internal consistency for the eight items was also satisfactory (Cronbach's $\alpha = 0.815$). We assessed the data's psychometric suitability using the Kaiser Meyer Olkin measure of sampling adequacy (0.855) and Bartlett's Test of Sphericity, which showed statistical significance ($p < 0.05$). All eight items demonstrated acceptable communalities (> 0.30), so we retained them in the final version. To address the open-ended final question,

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we employed the Delphi method. The expert panel reached a consensus to include an additional item (question 9) in the validated questionnaire. Our findings demonstrate that the translated version, now called the Brief Illness Perception Questionnaire-Urdu (BIPQ-U) is a valid and reliable instrument that can facilitate research on illness perceptions in Urdu-speaking regions.

Keywords: translation, psychometric evaluation, illness perception, urdu

Introduction

For decades, healthcare and social scientists have strived hard to get rigorous insights into patients' beliefs, interpretations, and behaviours toward illness.[1] These beliefs, referred to as illness perceptions, significantly influence the health-seeking behaviors of patients, impacting their overall well-being.[2] Positive illness perceptions are associated with better health outcomes;[3] holding negative perceptions lead to increased health issues, poorer recovery rates, and a lower quality of life.[4] Consequently, continuous assessment of illness perception during treatment is highly recommended in the literature, and aspects like symptoms, causes, consequences, and controllability should be considered before coming to a definite conclusion.[5,6] Within this context, Sawyer et al in their review recommended that a multifaceted approach including behavioural, clinical, educational, and psychosocial components is needed to improve illness perception through educative, cognitive-behavioural, or psychodynamic counselling.[7]

Accordingly, several philosophers and theorists have tried to link illness perception with healthcare-related behavioural models. In line with the discussion, Leventhal and associates proposed the Common-Sense Model (CSM) of Illness, which explains how individuals perceive their illness and develop models of health threats. The threats later shape as a guide to self-management behaviours. The model also successfully identified multiple factors that affect an individual's coping strategies.[8] The authors concluded that cognitive representations of illnesses play a vital role in the development of self-management strategies that influence health-related decisions and outcomes.[8] In a nutshell, the CSM identified individuals as "common-sense scientists" who consistently strive to manage their health conditions. The Common-Sense Model is frequently applied in healthcare and social research, aiding in the understanding of patients' perceptions and the measures taken in response to their ailments.[9] Even though assessing an individual's cognitive representations while managing the illness is fundamental, evaluating illness perception remains unclear. We must remember that illness perception is highly personal and exceedingly subjective. Moreover, illness perception is influenced by individual experiences, beliefs, and cultural background. Therefore, the illness perception evaluation methods and tools require stout and robust validation and commendation. This is one possible reason for the scarcity of research instruments focusing on the assessment of illness perception in the literature.

Since the applicability of the CSM in research, more objective measures have been developed and reported. From this perspective, the Illness Perception Questionnaire (IPQ) was developed by Weinman et al to evaluate illness perceptions on a five-point Likert scale.[10] Later, a revised version (Illness Perception Questionnaire-Revised) was introduced that extended the original scale by adding more items.[11] However, the revised version was excessive for patients (>30 items), particularly when they were critically ill, was time-consuming, and required extensive analysis. Consequently, a shorter questionnaire was needed that would be suitable for patients in all aspects. This led to the introduction of the Brief Illness Perception Questionnaire (BIPQ).[12] Developed by Broadbent et al in 2006, the BIPQ was shaped as a valuable tool for assessing illness perceptions. The BIPQ was brief, easy to understand, and required a few minutes to complete.[12] Since then, BIPQ has been extensively used in healthcare research. Comparable to the BIPQ, there are other instruments available such as the Child Illness Perception Questionnaire and has the limitation of being age specific.[13] The Illness Perception Questionnaire for Caregivers is also accessible from literature. The questionnaire however maintains the core structure of the Illness Perception Questionnaire-Revised and is simple a rewording that reflect caregiver perspectives.[11] Similarly, Illness Perception Questionnaire-Mental Health is also used commonly in literature and that again is a variation of Illness Perception Questionnaire-Revised and is disease specific.[14] Comparing the available illness perception questionnaires, BIPQ has been frequently administered to patients aged eight and over, with a wide range of illnesses, in 26 languages across 36 countries.[15] Hence, it is concluded that the BIPQ is a verified and reliable

instrument to measure illness perception in a variety of patients, irrespective of disease and age and thus is used recurrently in research.

Shifting our concerns to the assessment of patients' illness perception in Pakistan, this segment of research is vague, and there is a paucity of information. One possible reason is linked to the lack of validated research tools targeting illness perceptions in Urdu (the National language of Pakistan). Through an extensive literature review and communications with the original developers, we were unable to find a research tool that assesses illness perception and is validated and psychometrically tested among the Pakistani population. The unavailability of a reliable and valid tool for evaluating illness perception in the Urdu language was the motivation for the current research. In conclusion, the study aimed to translate and examine the psychometric properties of the Urdu version of the BIPQ among patients with Type 2 diabetes in Quetta City, Pakistan.

Material and Methods

Study Design and Settings

This study was a cross-sectional psychometric assessment conducted at the Medicine ward of Sandeman Provisional Hospital Quetta (SPHQ). Sandeman Provisional Hospital Quetta is a tertiary care teaching hospital that provides ambulatory care and inpatient services. Moreover, being public and with well-developed and equipped wards, SPHQ has complete facilities and advanced technologies to manage patients with acute and chronic diseases, including T2DM.[16]

Study Participants and Criteria

The study enrolled patients with T2DM who were willing, provided informed consent, and understood the requirements of long-term collaboration for test-retest analysis. Researchers approached only those patients who could speak, read, and write in Urdu, the national language of Pakistan, for data collection. They excluded illiterate individuals, patients with mental impairments requiring assistance to communicate with the principal investigator, and immigrants. Pregnant women were also excluded due to the mandatory nature of the re-test.

The Research Instrument (From Permission to Translation)

The Brief Illness Perception Questionnaire (BIPQ), originally developed by Broadbent et al,[12] was subjected to validation and psychometric evaluation in accordance with the established protocol.

Step 1: Translation and Validation of BIPQ (Permission Process)

The research team sent a formal request to Prof. Elizabeth Broadbent (Department of Psychological Medicine, Faculty of Medical and Health Sciences, The University of Auckland, New Zealand) via email. The English version of the BIPQ-U, along with the scoring criteria and permission, was also provided via email (Annexure I).[12]

Step 2: Translating the BIPQ Into Urdu (Forward Translation)

As reported in the guidelines proposed by the International Society of Health Economics and Outcome Research[17] and the World Health Organization,[18] the BIPQ-U was translated into Urdu (the National language of Pakistan). To ensure linguistic accuracy, five independent translators, all native Urdu speakers with academic-level proficiency in English, were engaged in the translation. All translators were blind because we wanted the Urdu version of BIPQ to be supposedly equal to the original BIPQ. Furthermore, our focus was to avoid discrepancies and partiality in the translation process. This ensured that the translated version received by the translators was without any mutual discussion. Once the translation was confirmed, the BIPQ [now termed Brief Illness Perception Questionnaire – Urdu (BIPQ-U)] was subjected to reverse translation.

Step 3: Translating the BIPQ-U Into English (Backward Translation)

Likewise, five independent translators (native speakers of the English language with academic proficiency in Urdu) performed the reverse translation. As discussed above, these translators were also blind for the above-mentioned reasons.

Once the research team received the two translated versions (Urdu and English), an expert panel discussion (pre-pilot) was conducted to discuss issues associated with the questionnaire translation process.

Step 4: Expert Panel Discussion (Pre-Pilot)

A bilingual expert panel consisting of three diabetologists and two experienced scientists from the Health System Research was established. The panel members were not involved in the current project. The panel discussion was convened by the research supervisor (FS), and the two translated versions of the questionnaire were compared for misperceptions, inconsistencies, and differences. After reaching a mutual consensus, the Urdu version of BIPQ was subjected to a pilot study.

Pilot Study

Patients with T2DM attending SPHQ medicine wards for their routine consultation were offered BIPQ-U. Nurses stationed at the medicine ward were involved in identifying T2DM patients. Non-probability convenience sampling method was used and T2DM patients were selected based on their availability, accessibility, and willingness to take part in the study.[19] The pilot study was conducted to establish the internal consistency and validity of BIPQ-U. Respondents' views on the translated instrument were considered and discussed in a second expert panel discussion (post-pilot).

Expert Panel Discussion (Post-Pilot)

The BIPQ-U, along with minor reservations on clarity (question 1 and 3), was presented to an expert panel for post-pilot discussion. Based on the reservations, revisions were made, and the updated version was subsequently shared with the pilot study participants for their feedback. No further changes were highlighted by the participants and the expert panel approved the finalized version of BIPQ-U for field study after consensus (Annexure II).

Delphi Technique (for Question 9 of BIPQ)

The final question of the questionnaire, designed in an open-ended format with three response options, required additional expert input for validation. A Delphi group was convened specifically for this item. The group consisted of three subject-matter experts, and the session was moderated by the research supervisor (FS). Experts rated the item using a 4-point relevance scale: *absolutely necessary = 3, necessary = 2, useful but not required = 1, and not useful, must be deleted = 0*. Content validity was assessed using both the item-level content validity index (I-CVI) and the scale-level content validity index (S-CVI), as recommended by Zafar et al.[20] Items with I-CVI values below 0.70 were considered for removal; values between 0.70 and 0.79 indicated a need for revision; and values ≥0.80 were deemed acceptable An S-CVI value above 0.80 indicated overall acceptable content validity.[21] Based on the panel's consensus, the final item was incorporated into the translated version of the BIPQ-U.

Following content validation, face validity was evaluated by administering the preliminary questionnaire to a cohort of 10 patients. Respondents rated each item on a 10-point scale, focusing on comprehension, clarity, unambiguity, and risk of misinterpretation. Mean scores were calculated for each criterion, including understanding (8.45 ± 0.41), unambiguity (8.45 ± 0.45), clarity (8.88 ± 0.44), and likelihood of misinterpretation (9.20 ± 0.73). The overall face validity score averaged 8.50 ± 0.41. Content validity findings revealed that I-CVI values ranged from 0.875 to 1.000, while the S-CVI/Average was 0.838, indicating an acceptable level of content validity for the final instrument.[22]

Sampling Procedure

Sampling for the Pilot Phase (Test-Retest at Two Different Points)

For an acceptable sample size in translation studies, Cohen disputed that the population correlation coefficient and effect size measurement should be used as a benchmark.[23] Keeping the suggestion in mind, with a significance of <0.05 and statistical power of 80%, 30 respondents were approached to participate in the test-retest phase as proposed by Field.[24]

Sampling for Factor Analysis (Field Test)

Construct validity was assessed through Exploratory Factor Analysis (EFA). In accordance with established recommendations, a subject-to-variable ratio of 10:1 was applied to determine the appropriate sample size for EFA.[25,26] Based on this criterion, a minimum of 80 participants was required. To account for a potential 10% dropout rate, the sample size was adjusted to 88 and rounded to 90, ensuring adequate statistical power and factor solution stability.[27]

Statistical Analysis

The data were cleaned and coded in Microsoft Excel and later transferred to SPSS v 25.0. We used frequencies and percentages to explain the demographic variables. The test-retest reliability was assessed and interpreted through Cronbach's alpha reliability analysis.[27] Intraclass Correlation Coefficient (ICC) via the One-Way Random effects model with single measures was used to establish the construct's stability.[27,28] The validity of the BIPQ-U was established by EFA through principal axis factoring extraction and Oblique rotation with Kaiser Normalization.

Ethical Approval

This study was carried out in accordance with the Declaration of Helsinki. Ethical approval for the study was granted by the Institutional Review Board of the Department of Pharmacy, University of Balochistan (Approval No. DoP/EA/112). Permission was also obtained from the Medical Superintendent of SPH. All participants provided written informed consent to participate in the study and written informed consent for this publication.

Results

Demographic Characteristics of the Study Respondents

The demographics are presented in Table 1. The majority (14, 46.7%) of the respondents were in the 28–37 age group, and males dominated the cohort (63.3%). Sixty percent of the respondents were graduates, and 46.7% were public officials. Twenty-two respondents had a T2DM history of less than 5 years, and 23 (76.3%) were using oral hypoglycemic agents.

Table 1 Demographic Characteristics of Study Respondents (Pilot Phase)

Characteristics	Frequency (N)	Percentage (%)
Age in years (38.63±8.69)		
18–27	2	6.7
28–37	14	46.7
38–47	8	26.7
>47	6	20.0
Gender		
Female	11	36.7
Male	19	63.3
Income of respondents (Pk. Rs)*		
None	6	20
< 25,000	3	10
25,001–50,000	21	70
> 50,000	0	0
Educational level		
Illiterate	6	20
SSC**	3	10
HSSC***	3	10
Graduate	17	56.7
Postgraduate	1	3.3

(*Continued*)

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Table 1 (Continued).

Characteristics	Frequency (N)	Percentage (%)
Marital status		
Married	23	76.7
Unmarried	5	16.7
Divorced	1	3.3
Widowed	1	3.3
Occupation of the respondents		
Housewife	5	16.7
Public	14	46.7
Private	9	30.0
Unemployed	2	6.7
Duration of disease		
< 5 years	22	73.3
> 5 years	8	27.7
Treatment regimen		
Insulin	7	23.3
OHA****	23	76.7
Family history of Type II Diabetes Mellitus		
Yes	19	63.3
No	11	36.7

Notes: *Pakistan Rupees (1 Pk. *Rs* = 0.0036 USD), **Senior Secondary School Certificate, *** Higher Secondary School Certificate, ****Oral hypoglycemic agent.

Reliability Analysis (Time 0 and Time 1)

We piloted the BIPQ-U with thirty respondents at two time-points (time zero and time one, with an interval of 2 weeks from time 0). The following criterion of reliability was cross-referred: $0.9 \leq \alpha$ (excellent), $0.8 \leq \alpha < 0.9$ (good), and $0.7 \leq \alpha < 0.8$ (acceptable) as reported in the literature.[29,30] At time zero, the 8-item BIPQ-U exhibited a good Cronbach's value of 0.814 (test). Furthermore, the BIPQ-U reported an acceptable value of 0.800 at time one (re-test), which illustrated satisfactory internal consistency at two-time points (Table 2).

Construct Stability Assessment

The research team assessed the stability of the constructs by calculating the Intraclass Correlation Coefficient (ICC) using a One-Way Random Effects Model (Model 1) based on single measurements.[31,32] The literature reports ICC

Table 2 Reliability of Test–Re-Test (N=30; Pilot Phase)

Items in BIPQ-U	Cronbach's Alpha Coefficient (Based on Standardized Items)			
	Test (Time 0) Week 1	Scale When Item Items Deleted	Re-Test (Time 1) Week 3	Scale when Items Deleted
How much does your illness affect your life?	0.814	0.816	0.800	0.803
How long do you think your illness will continue?		0.809		0.804
How much control do you feel you have over your illness?		0.796		0.799
How much do you think your treatment can help your illness?		0.804		0.801
How much do you experience symptoms from your illness?		0.784		0.800
How concerned are you about your illness?		0.817		0.803
How well do you feel you understand your illness?		0.809		0.86
How much does your illness affect you emotionally? (eg does it make you angry, scared, upset or depressed?)		0.810		0.809

Table 3 Construct Stability Assessment (N=30; Intraclass Correlation Coefficient)

Items in BIPQ-U	Intraclass Correlation Coefficient*	95% Confidence Interval	p-Value
How much does your illness affect your life?	0.811	0.828–0.911	< 0.05
How long do you think your illness will continue?	0.809	0.721–0.919	< 0.05
How much control do you feel you have over your illness?	0.825	0.743–0.920	< 0.05
How much do you think your treatment can help your illness?	0.840	0.812–0.900	< 0.05
How much do you experience symptoms from your illness?	0.823	0.812–0.903	< 0.05
How concerned are you about your illness?	0.821	0.884–0.910	< 0.05
How well do you feel you understand your illness?	0.815	0.734–0.908	< 0.05
How much does your illness affect you emotionally? (eg does it make you angry, scared, upset or depressed?)	0.851	0.800–0.909	< 0.05

Notes: * Intraclass Correlation Coefficient values using One Way Random effect model (Model 1), single measures, 95% Confidence Interval.

values of < 0.50 as (low), 0.50–0.75 as (moderate) and > 0.75 as (good), and the same was used as a reference in the current study.[28,33] As shown in Table 3, the ICC for all items tested for intra-rater (test-retest) reliability was good and exhibited coefficient values of > 0.80.

Field Test Evaluation

The data from the field test is presented in Table 4. The cohort was predominantly comprised of individuals aged 28–37 years (40, 44.4%), and all respondents resided in urban areas. Sixty-five (72.2%) were males, while 51 (56.7%) were graduates. The internal consistency, as measured by Cronbach's alpha statistics (n = 90) for the total pooled (8-item) scale, showed acceptable reliability with an α of 0.815 (Table 5).

Table 4 Demographic Characteristics of Study Respondents (Field Study)

Characteristics	Frequency (N)	Percentage (%)
Age in years (38.01±9.44)		
18–27	14	15.6
28–37	40	44.4
38–47	18	20.0
>47	18	20.0
Gender		
Female	25	27.8
Male	65	72.2
Income of respondents (Pk. Rs)*		
None	18	20.0
< 25,000	9	10.0
25,001–50,000	39	43.3
> 50,000	24	26.7
Educational level		
Illiterate	15	16.7
SSC**	12	13.3
HSSC***	9	10.0
Graduate	51	56.7
Postgraduate	3	3.3
Marital status		
Married	60	66.7
Unmarried	24	26.7
Divorced	3	3.3
Widowed	3	3.3

(*Continued*)

Table 4 (Continued).

Characteristics	Frequency (N)	Percentage (%)
Occupation of the respondents		
Housewife	11	12.2
Public	46	51.1
Private	27	30.0
Unemployed	6	6.7
Duration of disease		
< 5 years	56	62.2
> 5 years	34	37.8
Treatment regimen		
Insulin	29	32.2
OHA****	61	67.8
Family history of Type II Diabetes Mellitus		
Yes	57	63.3
No	33	36.7

Notes: *Pakistan Rupees (1 Pk. *Rs* = 0.0036 USD), **Senior Secondary School Certificate, *** Higher Secondary School Certificate, ****Oral hypoglycemic agents.

Table 5 Reliability Values (N = 90, Field Test)

Constructs in BIPQ-U	Cronbach's Alpha Coefficient (Based on Standardized Items)	
	N = 90	Scale when Item Deleted
How much does your illness affect your life?	0.815	0.810
How long do you think your illness will continue?		0.812
How much control do you feel you have over your illness?		0.805
How much do you think your treatment can help your illness?		0.820
How much do you experience symptoms from your illness?		0.804
How concerned are you about your illness?		0.809
How well do you feel you understand your illness?		0.810
How much does your illness affect you emotionally? (eg does it make you angry, scared, upset or depressed?)		0.807

Discriminative Validity

The Mann–Whitney *U*-test was used to determine whether the BIPQ-U could discriminate between males and females from the same sample. The significance level was set at $p < 0.05$. The discriminative validity evaluated via the Mann–Whitney *U*-test revealed a statistically significant difference ($p = 0.025$) between females and males supporting the scale's ability to distinguish between known groups.[34]

Exploratory Factor Analysis: Assessment of Construct Validity

Based on the guidelines, we used the Kaiser-Meyer-Olkin measure of sampling adequacy for the factor analysis.[35–37] The sample adequacy value was 0.855 which was meritorious.[31,38] Also, with $\chi 2 = 163.39$ and $p < 0.05$, Barlett's Test of Sphericity revealed relationships between the data and suitability of EFA[39–41] as shown in Table 6.

Table 7 presents the extracted communalities and factor loadings for the BIPQ-U. To minimize the risk of value suppression arising from complex factorial relationships, the analysis incorporated all three matrices.[42,43] Based on the criterion of initial eigenvalues greater than 1, the research team extracted four factors, which collectively explained

Table 6 Sample Adequacy Analysis

KMO and Bartlett's Test		
Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.855
Bartlett's Test of Sphericity	Approx. Chi-Square df Significance	163.394 28 0.004

Table 7 Factors Sources and Variance of the Model

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.292	28.645	28.645	2.292	28.645	28.645	1.988
2	1.628	20.347	48.992	1.628	20.347	48.992	1.652
3	1.149	14.359	63.350	1.149	14.359	63.350	1.480
4	1.009	12.615	75.965	1.009	12.615	75.965	1.241

75.96% of the total variance (Figure 1). An exploratory factor analysis using principal component analysis with direct oblimin rotation initially extracted four factors based on eigenvalues greater than 1, accounting for 75.97% of the total variance. However, inspection of the rotated pattern matrix revealed that only three factors had substantial primary loadings and were theoretically meaningful. These factors were labeled Cognitive Representation, Emotional Representation, and Control and Understanding, consistent with previous findings on the BIPQ.[12] The fourth factor, although statistically retained, did not exhibit any dominant item loadings and was therefore excluded from interpretation due to insufficient conceptual clarity and empirical support as shown in Table 8. All items demonstrated strong factor loadings (> 0.70) and high communalities (0.63–0.83), indicating well-defined constructs within the translated version of the BIPQ.

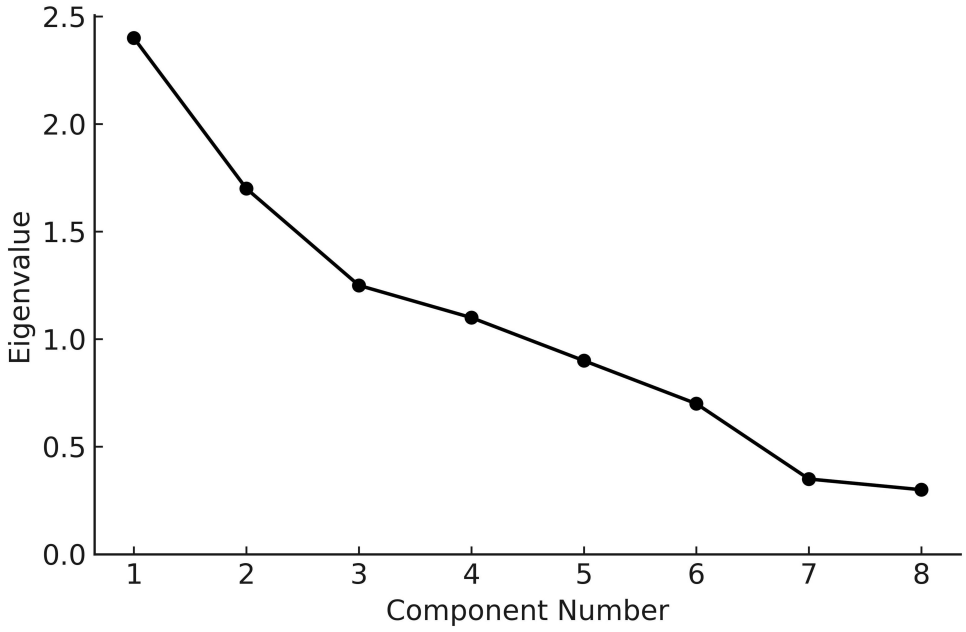

Figure 1 Scree plot highlighting the four extracted factors.

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Table 8 Factor Loadings From Exploratory Factor Analysis

Item #	Item Text	Primary Loading	Factor	Factor Name
1	How much does your illness affect your life?	0.766 (F1)	Factor 1	Cognitive Representation
2	How long do you think your illness will continue?	0.746 (F1)	Factor 1	Cognitive Representation
3	How much control do you feel you have over your illness?	0.853 (F3)	Factor 3	Control and understanding
4	How much do you think your treatment can help your illness?	0.844 (F3)	Factor 3	Control and understanding
5	How much do you experience symptoms from your illness?	0.840 (F1)	Factor 1	Cognitive Representation
6	How concerned are you about your illness?	0.615 (F2)	Factor 2	Emotional Representation
7	How well do you feel you understand your illness?	0.451 (F3)	Factor 3	Control and understanding
8	How much does your illness affect you emotionally? (eg does it make you angry, scared, upset or depressed?)	0.664 (F2)	Factor 2	Emotional Representation

Notes: Only primary loadings (> 40) are shown for clarity; Although four factors were extracted based on eigenvalues > 1, only three meaningful and interpretable factors emerged, as no item had a dominant primary loading on the fourth factor. Hence, the fourth factor was excluded from interpretation.

Table 9 Survey Items, Rotated Factor Loading, and Communalities (n = 90)

Constructs	Component Matrix*				Pattern Matrix*				Structure Matrix*				Communalities
	1	2	3	4	1	2	3	4	1	2	3	4	0.766
1	0.492	0.392	0.328	0.513	0.192	0.155	0.808	0.217	0.319	0.087	0.819	0.135	0.632
2	0.315	0.304	0.663	0.032	0.113	0.189	0.726	0.251	0.026	0.172	0.732	0.285	0.827
3	0.746	0.187	0.465	0.141	0.916	0.036	0.084	0.037	0.904	0.103	0.078	0.022	0.842
4	0.549	0.569	0.080	0.460	0.283	0.853	0.201	0.106	0.317	0.857	0.116	0.015	0.796
5	0.840	0.011	0.273	0.123	0.785	0.178	0.141	0.243	0.825	0.276	0.263	0.257	0.719
6	0.198	0.451	0.252	0.643	0.119	0.002	0.021	0.840	0.125	0.115	0.025	0.839	0.822
7	0.446	0.615	0.491	0.058	0.116	0.844	0.244	0.153	0.006	0.861	0.239	0.237	0.766
8	0.386	0.664	0.018	0.287	0.497	0.184	0.236	0.522	0.521	0.201	0.356	0.561	0.673

Notes: *Extraction Method: Principal Component Analysis; Rotation Method: Oblimin with Kaiser Normalization. 1. How much does your illness affect your life? 2. How long do you think your illness will continue? 3. How much control do you feel you have over your illness? 4. How much do you think your treatment can help your illness? 5. How much do you experience symptoms from your illness? 6. How concerned are you about your illness? 7. How well do you feel you understand your illness? 8. How much does your illness affect you emotionally? (eg does it make you angry, scared, upset or depressed?).

The research team followed Field's criterion, retaining constructs with communalities greater than 0.30.[24] As shown in Table 9, all eight constructs demonstrated acceptable factor loadings (> 0.40). Based on these findings, all items of the translated BIPQ-U were retained, supporting the construct validity of the instrument.

Discussion

Nunstedt et al reasoned that patients' need for acquaintance and understanding of their disease is of great importance. This understanding, therefore, serves as an essential prerequisite for improved adherence and self-participation in the disease management process.[44] Supported by several scholars worldwide, the assessment of illness perception is now gaining growing academic interest, aiming to understand how illness perceptions shape healthcare outcomes.[6,15] Nevertheless, it is important to recognize that illness perception is a subjective phenomenon, necessitating the use of robust and validated methodologies for its assessment. Therefore, the present study was conducted to psychometrically

evaluate an already validated tool in the Urdu language, with the aim of making it applicable in Pakistan as well as in other regions where Urdu is commonly used as a language of communication.

The BIPQ and its translated versions are a flexible, cross-disciplinary tool that goes beyond the clinical world. They provide structured insight into how people think and feel about health conditions, and that's valuable in any field that concerns human wellbeing.[12] Corelating to the current study, the BIPQ-U is also capable of supporting multidisciplinary research in resource-deprived country such as Pakistan. Healthcare professionals can effectively use the BIPQ-U in clinical settings to gain rapid insight into how patients view their illness. This will help in understanding patients' beliefs, categorizing barriers to treatment adherence and monitor changes in illness perception over time.[45] Parallel, psychologists can use the BIPQ-U to assess patients' cognitive and emotional representations of their illness. This will aid in in understanding the psychological dimensions of health and tailoring interventions that address beliefs, fears, and coping mechanisms.[46] Furthermore, medical social workers, educators and occupational therapists can also benefit from using BIPQ-U, particularly where understanding a person's beliefs and emotional responses to illness can improve outcomes.[12,15,47] Our declaration is supported by Abbas et al, whereby the authors concluded that research instrument focusing beliefs, stigmas and taboos validated in local languages can be utilized by healthcare professionals, psychologists and social workers that can promote multidisciplinary research.[30]

The BIPQ-U was tested on patients with Type 2 Diabetes Mellitus. Selecting diabetes patients was rational and straightforward. According to the International Diabetes Federation, 26.7% of the population in Pakistan is diabetic[48] and the age-standardized prevalence (20–79 years) is 30.7%, which is the highest in the world.[49] We believe that among multiple factors,[31] perception of diabetes plays a vital role in poor diabetes control in Pakistan. For that reason, we psychometrically validated the BIPQ-U, which will be utilized to assess illness perception in Pakistan's healthcare settings.

The BIPQ-U reported good psychometric properties and was coherent with our study patients. With an overall alpha index of 0.815, the translated version was deemed reliable, exhibiting acceptable internal consistency. The adequate alpha value goes parallel with the parent study[12] and other studies of the same nature.[50–53] Similarly, the ICC via the One-Way Random effects model with single measures for all items tested for intra-rater reliability was excellent. The coefficient values were significant and are well supported by the literature.[24,54] The significant coefficient values confirmed the repeatability of item measurements between the two-time intervals and demonstrated a satisfactory relationship between multiple items of BIPQ-U.

The adopted guidelines for validation studies recommend establishing sampling adequacy and completeness of the dataset under observation prior to EFA.[17,18] Therefore, we applied Kaiser Normalization with Oblique rotation to establish sample adequacy and probabilities of running an EFA. This was selected based on the values extracted by the Shapiro–Wilk test, as the data set violated the assumption of normality. The sample adequacy value was 0.855 (meritorious), and a significant Barlett's Test of Sphericity ($\chi 2 = 163.39$ and $p < 0.05$) revealed relationships in the data.[40,55] Furthermore, with the positive zero-order correlations, no corrective actions were needed. With acceptable values and positive correlations, the dataset was subjected to EFA.

As recommended, the extracted communalities were used as a reference for item retention and loading values of greater than 0.30 were retained.[24,27] As presented in Table 8, the extracted communalities for all items of BIPQ-U ranged from 0.632 to 0.842, confirming that all items of the original BIPQ can be adopted in the translated version. Furthermore, with highly acceptable loading values, the factors extracted during the EFA could establish the validity of BIPQ-U. Summarizing the results, items identified during the EFA were like the parent version of BIPQ[12] and other endorsed versions.[50,51,53] Concluding our discussion, the impressive scale reliability and sound construct validity of the BIPQ-U rate it as a dependable instrument in research and individual diagnostics.

Strengths and Limitations

We agree with the developers of BIPQ that this specific instrument should be viewed as an initial screening device to identify illness perception. Parallel to this assessment, it is essential to consider other problems that patients may be facing. However, we had informal communication with the respondents regarding their views on the BIPQ-U. Respondents in the current study felt that the BIPQ-U effectively captured their specific experiences and concerns

while living with diabetes. Subsequently, the BIPQ-U provides an opportunity to capture patients' perceptions, which is not possible by adopting other instruments.

Although the results were encouraging and supportive of the validation process, the limited sample size is always concerning. Particularly the sample size was not supportive of performing a Confirmatory Factor analysis. In addition, self-report measures can result in response bias and extending the result to other cultures might be difficult. However, to strengthen the psychometric robustness of BIPQ-U, we recommend a study with a larger and more diverse sample. This will allow the verification of the results established through EFA in the current study. Furthermore, a large sample size will ensure superior statistical rigor for model fit indices and a comprehensive validation of the instrument across broader populations.

Conclusion

The BIPQ-U is a reliable tool for assessing illness perception among Urdu-speaking patients. It can help healthcare providers better understand patient beliefs and improve care. Moreover, the BIPQ-U holds the potential for application in patients with acute and chronic diseases.

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Disclosure

The authors report no conflicts of interest in this work.

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