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Translation, cross-cultural adaptation, and psychometric evaluation of the brief illness perception questionnaire into Yoruba language among persons with chronic low back pain

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Abstract

Background Illness perception may influence the coping behaviors of patients. There is a lack of tools to measure this construct among Yoruba speakers. Therefore, we translate, cross-culturally adapt and determine the reliability and the validity of the Yoruba version of the Brief Illness Perception Questionnaire (BIPQ-Y).

Methods The translation and cross-cultural adaptation process was according to Beaton criteria. The psychometric testing of the BIPQ-Y was carried out among 28 consenting patients with low back pain attending a university teaching hospital, while only 10 of them participated in the reliability test. The convergent and discriminant validity of the BIPQ-Y was carried out using the Fear Avoidance Belief Questionnaire and Quadruple Visual Analogue scale. Confirmatory factor analysis was to assess construct validity.

Results The mean age of the respondents was 47 ± 15.3 years. The concurrent validity of the BIPQ-Y was excellent ($r = 0.996$) for the total score of BIPQ-Y while the internal consistency was moderate ($\alpha = 0.52$). The test–retest of BIPQ-Y yielded excellent results with item intra-class correlation coefficient (ICC) ranging between 0.833 and 0.973 and an overall ICC of 0.889. For the confirmatory analysis of the BIPQ-Y, the factor loading for the eight items ranged from − 0.071 to 0.799 and the composite reliability was good with a score of 0.68.

Conclusion The BIPQ-Y demonstrated excellent psychometric properties that are satisfactory with standards, and it is recommended for assessing illness perceptions of patients with chronic low back pain among the Yoruba-speaking populations.

Keywords Brief-IPQ, Cross-cultural adaption, Nigeria, Psychometric testing, Translation, Yoruba

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Background

Exposure to illnesses or adverse health conditions leads to the development of a structured pattern of beliefs among the sufferers [1, 2]. These patterns of beliefs are often referred to as 'illness perceptions', which are emotional representations and cognitive framing or expression of an illness experienced by an individual [2]. Illness perception influences a patient's future behaviors and coping strategies regarding managing an illness [3]. Coping mechanisms by patients after developing an illness vary extensively depending on perceptions or representations of the illness [4]. It is opined that several physicians/clinicians are unfamiliar with these self-manifested illness perceptions as organized cognitive representations or beliefs that patients have about their illnesses, treatment adherence and outcomes, and functional recovery [1].

Some investigators have associated negative illness perceptions with poorer recovery and increased healthcare use [1]. On the other hand, positive illness perceptions influence an earlier return to work [5, 6]. Thus, a need for assessment of illness perceptions, especially in chronic and severe illness conditions [1]. Five components of cognitive representations of illness have been identified by researchers. These are identity, consequences, cause, timeline, and controllability/curability [7, 8].

Illness perceptions as a psychosocial construct may constitute a confounding factor in patient assessment and management [9]. In light of these, assessment of illness perceptions is recommended among healthcare professionals including physiotherapy [10] as a way to ensure best treatment outcomes, as well as achieve good communication with patients [11]. A number of tools have been developed to assess illness perceptions. These include the Scale for the Assessment of Illness Behavior (SAIB) [12], The Self-Perception and Relationships Tools(S-PRT) [13], the Revised Illness Perception Questionnaire (IPR-Q) [14], and the Brief Illness Perception Questionnaire (Brief IPQ) [15].

Of the different tools, the Brief IPQ has substantial support in the literature as a useful tool for assessing illness perceptions [15]. Its brevity, ease of understanding, and completion are among its advantages. As a result, the Brief IPQ has been employed in a wide range of studies involving patients with arthritis [16], brain injury [17], and diabetes [18], as well as among children and adolescents [19] with special needs. Cross-cultural adaptation of the Brief IPQ has been completed in Dutch [20], Spanish [21], Korea [22], Malaysia [23], and Vietnamese [24]. The original English version and the other translations have been reported to have moderate to excellent psychometric properties [15], except for the Dutch version where respondents reported difficulties [20]. Owing to variations in mental framing and emotional representations of illness across different contexts [25], there is still a need for cross-cultural adaptations of the tool in other languages.

The availability of psychosocial assessment tools, such as the Brief IPQ, may help improve illness perceptions [15], especially among indigenous people who are only literate in their native languages. Evaluations of psychosocial constructs are particularly difficult among Nigerians [26]. This is due to their tendency to report their anticipations rather than their realities [27]. In Nigeria, Yoruba is a language spoken most commonly in the Southwest geopolitical zone of the country. Broadly, Yoruba, as a multi-dialectical branch of the Niger-Congo language family, is spoken by about 45 to 55 million people spreading over Nigeria, Benin Republic, Togo, and among small migrant communities in Cote d'Ivoire, The Gambia, and Sierra Leone [28]. Outside of the West African context, the Yoruba language is also used in the Afro-Brazilian and Afro-American religions in the Caribbean and North America respectively [28]. The objective of this study was to translate, cross-culturally adapt, and test the psychometric properties of the Brief IPQ in the Yoruba language.

Methods

This cross-sectional study comprises translation cross-cultural adaptation and psychometric evaluations. Participants for the psychometric evaluations were a purposive sample of patients with chronic low-back pain (LBP) attending the orthopedic clinic and outpatient clinic at the Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Osun state, Nigeria. These patients were 18 years and older, had no cognitive impairment and they were literate in both English and Yoruba languages. However, any patient with a self-reported history of spinal surgery, nerve blocks, or severe neurological conditions such as cauda equine syndrome were excluded. Prior to the study, the sample size was estimated using the standard formula [$N = Z^2\ P(1-\mathrm{P})/\mathrm{d}^2$]. Where N is the desired sample size; **Z** is the statistic corresponding to the level of confidence (95% = 1.96) a constant; **P** is the expected prevalence of the condition (it is obtained from the same studies, or a pilot study conducted by previous study); **d** is precision (total width of confidence interval (0.05).

$$N = \underline{1.96^2 \times 0.5539(1 - 0.5539)}/0.05^2. N = 384$$

Next, the sample size was adjusted by using the formula for population < 10,000 (adjustment was required on the total population of patients with LBP receiving treatment at the center at the time of the study; $n = 30$).

$N_a = N/1 + N/n$. Where N_a = adjusted sample size; N = calculated sample size. Hence, $N_a = 384/1 + 384/30$. $N_a = 27.8$ approximated to 28. The minimum sample of 28 was purposively selected. The participants were recruited between 21st June 2021 and 10th September 2021 and their written informed consent was obtained.

Instrument

The English version of the Brief-Illness Perception Questionnaire (BIPQ) [15]

The BIPQ is a tool assessing three representations of illness perceptions-cognition, emotion, and illness comprehensibility. The tool has eight items with an additional item on the causes of illness. Items 1–5 assess the cognitive representation: item 1 (consequences), item 2 (timeline), item 3 (personal control), item 4 (treatment control), and item 5 (identity). Two items assess the emotional representation: item 6 (concern), and item 8 (emotional impact). One item, item 7 (coherence) assesses the illness comprehensibility. All items are scored from 0 to 10, with higher scores reflecting greater illness representations. To compute the scores, items 3, 4, and 7 were reversed.

Fear Avoidance Belief Questionnaire (FABQ)

This patient-reported tool assesses how a patient's fear avoidance beliefs about physical activity and work which may contribute to their pain and disability [29]. The tool has 16 questions scored from 0 to 6 (maximum score of 96). The FABQ contains 2 scales: a working scale (FABQ-W) composed of 7 items (items 6, 7, 9, 10, 11, 12, and 15) and a physical activity scale composed of 4 items (items 2, 3, 4, and 5). The two scales are scored separately. Five additional items (Items 1, 8, 13, 14, and 16) which are not part of the scoring, complete the questionnaire. Higher FABQ scores indicate a high level of fear-avoidance beliefs. The FABQ-W has a point score that ranges from 0 to 42 points while the physical activity scale has a score point that ranges from 0 to 24 points.

Quadruple Visual Analog Scale (QVAS)

This self-reported tool measures pain intensity. The patient is asked to present the pain intensity by marking the VAS line between the two endpoints of "no pain" and "unbearable pain". The QVAS pain score is determined by measuring the distance on the 10 cm line between the "no pain" endpoint and the patient's mark. The QVAS contains 4 questions: current pain, average pain, best pain, and worst pain [30]. The scores from questions 1, 2, and 4 are averaged and then multiplied by 10 to yield a score from 0 to 100.

Ethical approval was obtained from the Health Research and Ethics Committee of the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria (ERC/2021/06/25). The purpose and procedure of the research was explained to each of the respondents.

Translation and cross-cultural adaptation of the English version of Brief-IPQ into Yoruba

This was conducted in accordance with the standardized international recommendation using five-step guidelines proposed by Beaton et al. [31]. Permission for translation of the tool to the Yoruba language was obtained from the original developer of the Brief-IPQ. Two native Yoruba speakers who were fluent in English independently translated the English version of Brief-IPQ into the Yoruba language. Two forward translations (T1 and T2) are involved in this stage. Another bilingual translator reviewed the items in the two Yoruba-translated questionnaires in order to produce a single, reconciled, and harmonized translation and synthesized them into one (T3). The reconciled Yoruba version of the Brief-IPQ (T3) was then back-translated into English by two bilingual native English speakers in order to assess the comprehensibility and clarity for conceptual equivalence with the original source version. This was referred to as BT1 and BT2. The back-translated and original version of the Brief-IPQ was reviewed and revised by the expert committee to establish the pre-final Yoruba version of the Brief-IPQ. The expert committee comprised two physiotherapists, a methodologist in outcome tools, and two linguists who are knowledgeable in both English and Yoruba languages (forward and backward translators). The panel reviewed, analyzed, critiqued, and resolved any discrepancies observed in the translations and then reached a consensus on all items on the tool in order to produce a prefinal translated version of the tool. They also judge the document and make any changes necessary to ensure clarity and suitability for general Yoruba people. The pre-final version was pilot-tested by 10 Yoruba-speaking individuals to coagulate the questionnaire's comprehensibility, perception, and interpretation and provide final input on its language (Additional file 1: Appendix S1).

Psychometric evaluations of the Yoruba version of the Brief Illness Perception Questionnaire (BIPQ-Y)

The BIPQ-Y was assessed for concurrent, convergent, and discriminant validity, and test–retest reliability. Each participant completed the English version of Brief-IPQ, BIPQ-Y, and Yoruba versions of FABQ and QVAS. One week after 10 participants completed BIPQ-Y again for test–retest analysis.

Data analysis

Data was summarized using descriptive statistics of mean, standard deviation, percentage, and median. The

test–retest reliability, which denotes stability across the repeated measurement, was evaluated through the intraclass correlation coefficient (ICC) with a 95% confidence interval. The internal consistency, which is the degree of homogeneity of the item, was assessed through Cronbach's alpha. Values ≥ 0.7 are acceptable for ICC and Cronbach's alpha [32]. The construct validity of the Brief-IPQ was determined by correlating with the Yoruba version of FABQ (convergent) and QVAS (discriminant) using Pearson's correlation coefficient. To measure the concurrent validity Pearson's correlation coefficient was also used. Also, confirmatory factor analysis and structural equation modeling were performed to examine the construct validity of the Yoruba version of BIPQ using a maximum likelihood estimator. Comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) were parameters used to assess model fit. The values of CFI and TLI ≥ 0.95 and RMSEA ≤ 0.05 are considered as good while the values of CFI and TLI ≥ 0.90 and RMSEA ≤ 0.08 are considered acceptable [33]. Data was analyzed using SPSS (Statistical Package for Social Sciences) and SPSS Amos 28 software with an alpha level of 0.05.

Results

The expert committee met to finalize the pre-final questionnaire following the backward translation stage. All items of the questionnaire were discussed; The BIPQ-Y did not undergo any significant structural changes. However modest culturally relevant adaptations were made, for example, item 3—"How much control do you feel you have over your illness" was translated as "Báwo lóṣe lérò pé óń ìṣàkóso lórí àìsàn rẹ to", instead of "Báwo lo ṣení ipá tó láti dẹ́kun àìsàn rẹ". This adaptation was supposed to help personalize the phrase in order to convey the meaning to the Yoruba speaker, or else the meaning may be confusing. Item 8, which is the emotional representation of illness—"How much does your illness affect you emotionally? (e.g. does it make you angry, scared, upset or depressed)" was culturally adapted to Yoruba. This is because "upset and angry" have the same root meaning in the Yoruba language. Also, 'Bawo' which means "how" was used all through the BIPQ-Y for structural formatting of the items to make it comparable with the format of the original English version.

The mean age, weight, height, and BMI were 47.4 ± 15.3 years, 75.3 ± 17.2 kg, 1.7 ± 0.1 m, and 27.0 ± 11.1 kg/m^2, respectively. The general and clinical characteristics of the participants are presented in Table 1. The median, range, skewness, and kurtosis of each item on the BIPQ-Y are shown in Table 1. The median score for the item in the BIPQ-Y ranges from 3.0 to 8.0. The lowest and highest scores were observed in item 2 and item 4, respectively. Higher scores indicate strong perception along that dimension. The skewness scores range from − 1.13 on item 4 to 0.56 on item 2. That is from most negative to positive.

Table 1 Personal and clinical characteristics of the participants

Variable	Minimum	Maximum	Mean ± SD	Median (IQR)	Skewness	Kurtosis
General characteristics						
Age (years)	21	70	47.4 ± 15.3		−0.46	−0.99
Weight (kg)	55	180	75.3 ± 17.2		3.61	16.00
Height (m^2)	1.5	1.9	1.7 ± 0.1		0.01	0.15
BMI (kg/m^2)	18.0	80.0	27.0 ± 11.1		4.31	20.96
Pain characteristics						
Current pain	2	9	5.1 ± 1.6		−0.02	0.06
Average pain	2	9	5.0 ± 1.9		−0.02	−0.86
Best pain	2	9	5.7 ± 2.0		−0.28	−0.67
Worst pain	2	9	5.8 ± 1.8		−0.45	−0.17
Illness perception						
Consequences	0	10		6.0 (4.0–7.0)	0.00	0.02
Timeline	0	10		3.0(1.0–7.0)	0.56	−0.96
Personal control	0	10		5.5(3.0–7.0)	−0.32	−0.81
Treatment control	1	10		8.0(7.0–9.8)	−1.13	0.76
Identity	1	10		5.0(3.0–6.0)	0.39	−0.23
Concerned	2	10		7.0(4.3–9.0)	−0.28	−1.35
Coherence	2	10		6.0(5.0–8.0)	−0.08	−0.49
Emotional response	0	10		5.0(2.0–7.0)	0.01	−1.15

Table 2 Psychometric properties of Yoruba version of Brief Illness Perception Questionnaire

Illness perception	Corrected item-total correlation	Cronbach's alpha if item deleted	Cronbach's alpha	Concurrent validity *r* (*p*)	Test–retest reliability			Confirmatory factor analysis		
					ICC	95%CI of ICC	*P*	Factor loading	R^2	Composite reliability
Consequences	0.175	0.509		1.000(0.001)	0.943	0.790–0.986	0.001	0.444	0.197	
Timeline	−0.238	0.669		0.998(0.001)	0.960	0.847–0.990	0.001	−0.071	0.005	
Personal control	0.056	0.553		1.000(0.001)	0.925	0.728–0.981	0.001	0.095	0.009	
Treatment control	0.159	0.516		0.998(0.001)	0.934	0.757–0.983	0.001	−0.240	0.058	
Identity	0.671	0.346		0.990(0.001)	0.886	0.609–0.970	0.001	0.898	0.806	
Concerned	0.349	0.450		0.978(0.001)	0.909	0.679–0.977	0.001	0.312	0.097	
Coherence	0.469	0.412		0.994(0.001)	0.973	0.895–0.993	0.001	−0.613	0.376	
Emotional response	0.608	0.306		0.990(0.001)	0.833	0.462–0.956	0.001	0.799	0.638	
Total items			0.520	0.996(0.001)	0.889	0.618–0.971	0.001			0.675

$X^2ML = 19.959$, $P = 0.276$, $CFI = 0.938$, $TLI = 0.898$, $RMSEA = 0.80$ (90%CI = 0.00–0.20)

Table 2 shows the psychometric properties of BIPQ-Y. The results (correlation coefficient(r)) of the concurrent validity of the BIPQ-Y (correlation between the English and Yoruba versions of Brief-IPQ) shows excellent correlation with items ranging from 0.978 to 1.0 (Fig. 1). The lowest and highest correlation coefficient [$r=0.978$ ($p=0.001$) and $r=1.000$ ($p=0.001$)] were observed for items 6 and 1, respectively. The correlation coefficient score for the total score of the BIPQ-Y was $r=0.996$ ($p=0.001$). The Cronbach alpha coefficient for the internal consistency of BIPQ-Y was moderate ($\alpha=0.52$).

Convergent validity of the BIPQ-Y (using the FABQ) yielded a non-significant negative correlation of $r=-0.129$ ($p=0.514$) and $r=-0.150$ ($p=0.445$) for FABQ-work and FABQ-physical activity scale, respectively (Table 3). Likewise, the correlation coefficient for the discriminant validity of the BIPQ-Y using the QVAS scale was $r=-0.050$ ($p=0.801$) (Table 3). The confirmatory factor analysis of the BIPQ-Y is presented in Table 2 and Fig. 2. The factor loading for eight items ranged from −0.071 to 0.799, and the factor loadings were good for only three items (5, 7, and 8). The one-model factor returned a satisfactory close fit after modification. The modification including three correlations residuals ranging from 0.37 to 0.50 [Comparative Fit Index (CFI) = 0.938; Tucker-Lewis Index (TLI) = 0.898; root mean square error of approximation (RMSEA) = 0.80 (90%CL = 0.00–0.20)].

The composite reliability was good (0.68). The test–retest reliability of the BIPQ-Y within 1-week interval was assessed using ICC as presented in Table 2. The ICC scores range between 0.833 and 0.973. Visual limit of agreement is shown in Fig. 3.

The known-groups validity of the BIPQ-Y item in terms of age group and gender, is presented in Table 4. The result showed a significant difference in the 'timeline' item 2 and 'emotional response' item 8 ($F=11.917$; $p=0.001$and $F=3.421$; $p=0.033$). For the known-group validity of the BIPQ-Y item by gender, the result showed that males had significantly higher mean scores in item 2 ($p=0.024$) and item 4 ($p=0.027$).

Discussion

This study aimed to translate, cross-culturally adapt, and test the psychometric properties of the BIPQ-Y. The patients in this study were those with chronic LBP. The age (47 ± 15.3 years) of the patients with chronic LBP observed in this study is within the age range of < 40 and > 60 years, in which LBP has been reported to be common [34]. Furthermore, age has been reported as an important factor needed to comprehend psychosocial construct among patients [35, 36]. This is because basic cognitive functions such as attention and memory are mostly affected by age [35, 36]. Therefore, it is implied that patients in this study have the capability to comprehend the Brief-IPQ. Moreso, they were also literate in both English and Yoruba.

The Beaton et al. [31] guideline for the translation of the tool was employed in this study. Accordingly, the translation process included forward translation, synthesis, backward translation, expert committee review, and pilot testing. It is postulated that the reliable application of questionnaires to a local language, and cross-cultural adaptation of specific questionnaires is not simple as not only language differences but also cultural differences should be taken into consideration for the reliability and the validity of questionnaires to be preserved [31]. Based on the foregoing, the cross-cultural adaptation of the Brief-IPQ was performed using expressions that are relative to the semantic, idiomatic, and conceptual equivalence, while preserving the original concepts.

There are many ways in which translated questionnaires could be tested for their psychometric comparability with the source version. In this study, the objective was to ensure that the BIPQ-Y has the psychometric properties needed for the intended application. A valid response rate of 100% was recorded in this study (as there were no invalid surveys), suggesting that the BIPQ-Y was an acceptable tool of outcome measure for knowing the illness perception. Thus, based on difficulty and quality rating, the BIPQ-Y had a high rate of data completion, with good quality data in the study population. From this study, a high concurrent validity was found for BIPQ-Y with items having correlation coefficient ranges greater than 0.70. The concurrent validity for the total score found in this present study exceeds the cut-off value of 0.7 which was considered desirable for good validity of the new tool [15]. Therefore, the BIPQ-Y has an acceptable concurrent validity ($r=0.996$; $p=0.001$). The Cronbach alpha scores fell within the excellent ranges recommended in the literature. The Alpha values of each item did not change substantially relative to the Alpha of the BIPQ-Y total score and were satisfactory. These findings indicate that all items in the BIPQ-Y are necessary for measuring illness perception, consistent with those reported for the version of Dutch (Cronbach's alpha of 0.74) [20], Chinese (Cronbach's alpha of 0.783) [37], Polish (Cronbach's alpha of 0.74) [38], and Turkish (Cronbach's Alpha for subscales between 0.715 and 0.774). The internal consistency reliability is not evaluated for the versions of the original English [15]. Our results suggest that BIPQ-Y is unidimensional as the structural equation modeling yielded 1-factor structural. This corroborated that all the items in BIPQ-Y are necessary to capture illness perception among patients with chronic LBP. This construct of factorial validity was similar to a previous

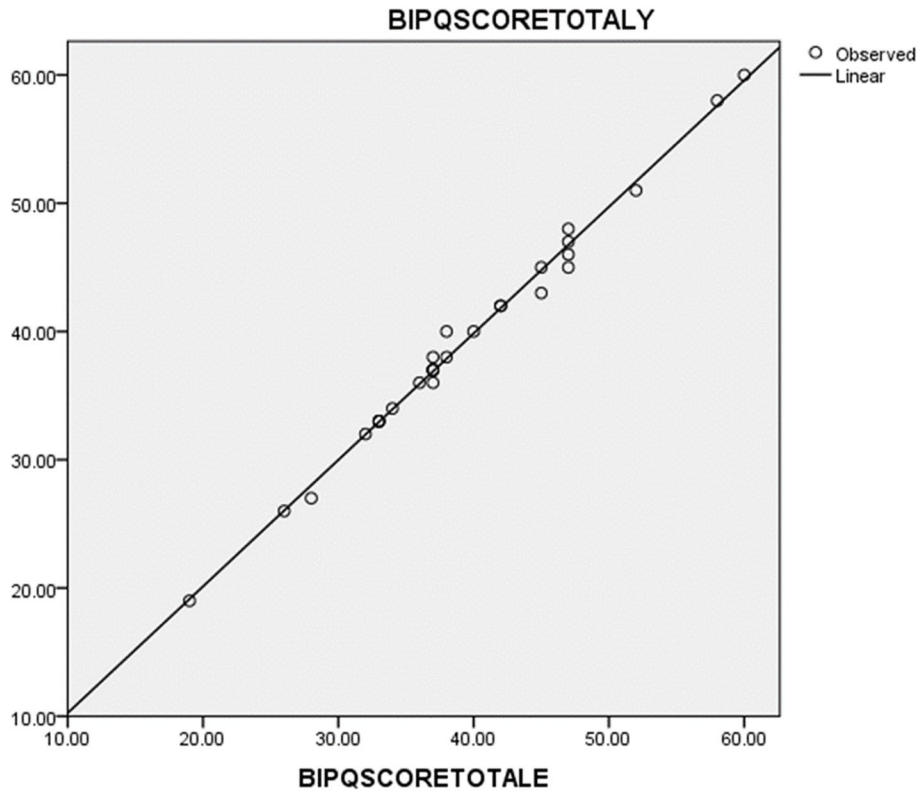

Fig. 1 Scatter plot diagram showing the correlation between the English and Yoruba versions of Brief-IPQ

Table 3 Discriminant and convergent validity of the Yoruba version of Brief Illness Perception Questionnaire (BIPQ-Y)

Discriminant validity (correlation between QVAS and BIPQ-Y)		**Convergent validity (correlation between FABQ and BIPQ-Y)**	
Variable	***r*(*p*)**	**Variable**	***r*(*p*)**
Current pain	−0.149 (0.449)	FABQ-work	−0.129 (0.514)
Average pain	−0.149 (0.450)	FABQ-physical activity	−0.150(0.445)
Worst pain	0.061 (0.758)		
Best pain	0.160 (0.417)		
Total pain scores	−0.050 (0.801)		

study that reported an acceptable unifactorial nature of Brief-IPQ among patients with periodontal diseases [33].

For construct validity of the BIPQ-Y was assessed by comparing the BIPQ-Y scale scores and single items with those for the other instrument based on hypotheses derived from theory a structured literature review of illness perception and was tested using the FABQ- and QVAS for its convergent and discriminant validity phases, respectively. The results for the convergent validity of BIPQ-Y with FABQ yielded negative correlation co-efficient scores of $r = -0.129$; $p = 0.514$ and $r = -0.150$; $p = 0.445$ for FABQ-Work and FABQ-Physical Activities (which are the two components of the FABQ scale). The results indicate that BIPQ-Y has low or no significant convergent validity with FABQ-Work and FABQ-Physical Activities as previously hypothesized. On the other hand, the finding on the discriminant validity of BIPQ-Y also indicates weak and low or not significant with a global score of QVAS.

For the test–retest reliability (within 1-week interval) of the BIPQ-Y, the ICC value for the total score is excellent (ICC = 0.889), and it is better than those reported for the original English BIPQ [15]. For the original English test–retest (ICC = 0.48–0.70 with a 3-week interval, and ICC = 0.42–0.75 with a 6-week interval). The results of the test–retest reliability of the translated versions of Dutch (ICC = 0.72) and Malay (ICC = 0.39 to 0.70 with a 2-week interval, and ICC = 0.58 to 0.78 with a 4-week interval) were lower than the present study [20, 23]. The superior ICC in the present study might be due to differences in intervals between test–retest. The excellent test–retest reliability in this study for Yoruba BIPQ indicates the stability of the measurement in patients with chronic LBP.

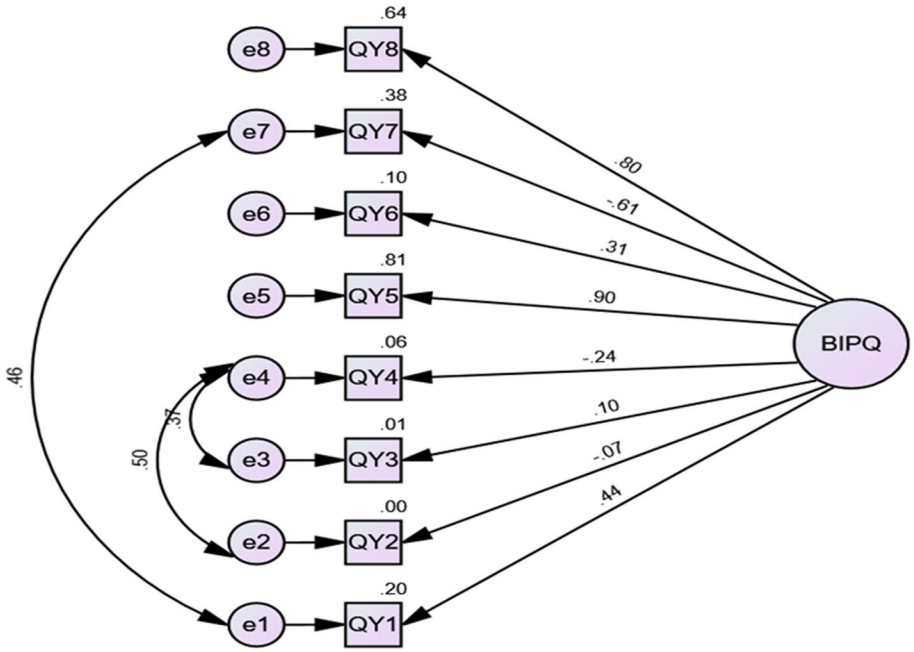

Fig. 2 Structural modeling of Yoruba version of brief illness perception questionnaire

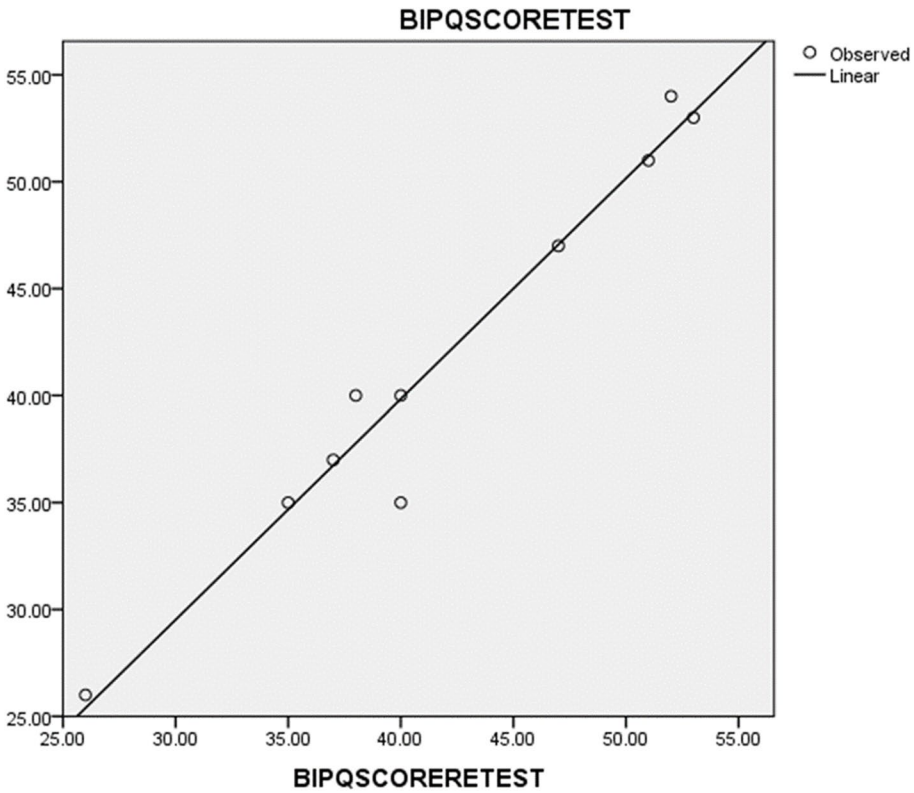

Fig. 3 Scatter plot diagram showing the correlation between test–retest of the Yoruba version of the Brief Illness Perception Questionnaire (BIPQ-Y)

Table 4 Known group validity of the items of BIPQ-Y by gender and age group

Illness perception	Gender			Age group (year)				*P*
	Male $\overline{X}$±SD	Female $\overline{X}$±SD	*P*	<40 $\overline{X}$±SD	40–50 $\overline{X}$±SD	51–60 $\overline{X}$±SD	>60 $\overline{X}$±SD	
Consequences	5.0 ± 1.9	6.2 ± 2.7	0.191	5.5 ± 1.6	6.2 ± 0.4	4.8 ± 3.1	7.0 ± 2.7	0.386
Timeline	5.0 ± 3.3	2.5 ± 2.3	0.024	1.8 ± 1.9	4.0 ± 2.8	2.8 ± 1.9	8.4 ± 1.1	0.001
Personal control	4.9 ± 2.4	5.7 ± 2.9	0.470	5.8 ± 3.0	5.6 ± 2.0	5.3 ± 2.3	8.4 ± 1.1	0.850
Treatment control	4.8 ± 2.8	2.7 ± 1.9	0.027	3.1 ± 1.7	3.2 ± 2.3	3.5 ± 2.5	5.2 ± 4.0	0.523
Identity	4.5 ± 2.6	5.1 ± 1.8	0.477	5.4 ± 2.1	6.4 ± 1.1	3.8 ± 1.8	4.6 ± 2.9	0.134
Concerned	5.8 ± 2.4	7.0 ± 2.3	0.157	6.1 ± 2.9	8.0 ± 1.7	6.4 ± 2.0	5.6 ± 2.0	0.431
Coherence	5.2 ± 2.1	4.8 ± 2.4	0.621	4.1 ± 2.2	4.8 ± 1.6	5.4 ± 2.4	5.8 ± 2.8	0.560
Emotional response	3.8 ± 2.7	5.5 ± 3.3	0.149	6.3 ± 3.0	6.8 ± 2.9	3.7 ± 2.8	2.4 ± 1.9	0.033

The results of this study on concurrent, reliability, and internal consistency indicate that the BIPQ-Y is a reliable and appropriate instrument to explore illness perceptions in Yoruba-speaking patients with chronic LBP. And useful tools that are helpful in daily clinical practice and that may contribute to an increase in knowledge of illness perceptions. It is also comprehensible and fast to complete, as well as easy interpretation of scores making it suitable for use in routine health care. The BIPQ-Y showed excellent psychometric properties comparable to the original English version, based on difficulty and quality rating. The BIPQ-Y had a high rate of data completion, with good quality data in the study population. Generally, the BIPQ-Y produced similar psychometric properties which are consistent with those reported for both the English and other translated versions. This study did not change the layout of the source of the BIPQ ensuring all the items were maintained. In addition, there was no significant structural alteration made to the BIPQ-Y, other than required cultural adaptations. In sum, the BIPQ-Y has excellent reliability and validity scores, and these study results provide support to the application of the instrument in clinical practice and as a patient-reported outcome instrument to assess patient illness perceptions alongside other measures of health outcomes.

Conclusion

The BIPQ-Y is an appropriate outcome tool with excellent psychometric properties for assessing illness perceptions of patients, especially those with chronic LBP.

Abbreviations

BIPQ-Y	Yoruba version of the Brief Illness Perception Questionnaire
BIPQ	Brief-Illness Perception Questionnaire
ICC	Intra class correlation coefficient
SAIB	Scale for the Assessment of Illness Behavior
S-PRT	Self-Perception and Relationships Tools
IPR-Q	Revised Illness Perception Questionnaire
Brief IPQ	Brief Illness Perception Questionnaire
LBP	Low-back pain
OAUTHC	Awolowo University Teaching Hospital complex
FABQ	Fear Avoidance Belief Questionnaire
FABQ-W	Fear Avoidance Belief Questionnaire-work scale
QVAS	Quadruple Visual Analog Scale
CFI	Comparative fit index
TLI	Tucker-Lewis index
RMSEA	Root mean square error of approximation
SPSS	Statistical Package for Social Sciences

Supplementary Information

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Additional file 1: Appendix S1. Yoruba version of the Brief Illness Perception Questionnaire

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Authors' contributions

CM and OJD made substantial contributions to the conception, design of the study, the acquisition, analysis, and interpretation of data and substantively revised the manuscript. FF, OOO, OF, TG, OP, and CF drafted the manuscript and substantively revised it. The authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Health Research and Ethics Committee of the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria (ERC/2021/06/25). All the participants gave informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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