DOI: 10.21088/potj.0974.5777.19226.6

Physiotherapy and Occupational Therapy Journal
Volume 19 Number 2, April - June 2026

ORIGINAL ARTICLE

Cross-Cultural Adaptation, Reliability, and Validity of the Gujarati Version of the Back Bournemouth Questionnaire in Adults with Chronic Low Back Pain

Shaikh Rumaisa Kosar[1], Bid Dibyendunarayan Dhrubaprasad[2]

HOW TO CITE THIS ARTICLE:

Shaikh Rumaisa Kosar, Bid Dibyendunarayan Dhrubaprasad. Cross-Cultural Adaptation, Reliability, and Validity of the Gujarati Version of the Back Bournemouth Questionnaire in Adults with Chronic Low Back Pain. Therapy Jr. 2026; 19(2): 138-148.

ABSTRACT

Background: The biopsychosocial model shows that chronic low back pain (CLBP) is maintained by physical, psychological, and social factors, necessitating comprehensive assessment tools. The Back Bournemouth Questionnaire (BBQ), a validated seven-item measure, has been adapted into multiple languages; however, there is no Gujarati version available for India's large linguistic community.

Objective: To cross-culturally adapt the Back Bournemouth Questionnaire into Gujarati (BBQ-G) and evaluate its psychometric properties in adults with CLBP.

Methods: We conducted a two-phase methodological study. Phase I involved cross-cultural adaptation following Beaton *et al.*'s five-step guidelines. Phase II assessed psychometric properties in 150 Gujarati-speaking adults (aged 25–60 years) with confirmed CLBP. Content validity was evaluated using a 20-expert panel. Internal consistency (Cronbach's alpha), test-retest reliability (intraclass correlation coefficient; n=30, 48-hour interval), and agreement (Bland–Altman analysis) were determined. Construct validity was assessed via Pearson's correlations with the Numerical Pain Rating Scale (NPRS), Fear-Avoidance Beliefs Questionnaire-Gujarati (FABQ-G), Roland-Morris Disability Questionnaire-Gujarati (RMDQ-G), and Patient Health Questionnaire-9-Gujarati (PHQ-9-G). Exploratory factor analysis was used to examine the underlying structure.

AUTHOR'S AFFILIATION:

[1] Private Physiotherapy Practitioner, Department of Musculoskeletal Physiotherapy, The Sarvajanik College of Physiotherapy, Surat, Gujarat, India.

[2] Head of the Department of Musculoskeletal Sciences, The Sarvajanik College of Physiotherapy, Rampura, Surat, Gujarat, India.

CORRESPONDING AUTHOR:

Bid Dibyendunarayan Dhrubaprasad, Head of the Department of Musculoskeletal Sciences, The Sarvajanik College of Physiotherapy, Rampura, Surat, Gujarat, India.

E-mail: dnbid71@gmail.com

Received: 30-04-2026 **Accepted:** 15-05-2026

Results: The BBQ-G demonstrated excellent content validity (S-CVI/Ave=0.95; I-CVI: 0.80-1.00), good internal consistency (Cronbach's alpha=0.82), and acceptable test-retest reliability (ICC=0.820; 95% CI: 0.656-0.910). Bland-Altman analysis revealed minimal bias (mean difference=-0.53; limits of agreement: -11.90 to 10.83), and the minimal detectable change at the 95% confidence level (MDC95) was approximately 12 points. Significant moderate-to-strong correlations were identified with the NPRS (r=0.679), PHQ-9-G (r=0.495), FABQ-G (r=0.431), and RMDQ-G (r=0.415; all p<0.001). EFA yielded a single dominant component (eigenvalue=4.272) explaining 61.03% of the total variance (KMO=0.839).

Conclusion: The BBQ-G is a reliable, valid, and culturally appropriate biopsychosocial instrument for assessing chronic low back pain in Gujarati-speaking adult and is suitable for both clinical practice and research.

KEYWORDS

• Chronic low back pain • Bournemouth Questionnaire • Cross-cultural adaptation • Reliability • Validity • Gujarati

INTRODUCTION

Low back pain (LBP) is the leading cause of disability globally, imposing a profound burden on individuals, healthcare systems, and society.[1] Recent estimates from the Global Burden of Disease study indicate that approximately 619 million individuals were affected by LBP in 2020, with projections suggesting an increase to 843 million by 2050.[2] The point prevalence among adults ranges between 7% and 12%, whereas the lifetime prevalence is estimated to be 40%–84%, with considerable variations across populations and geographic regions.[3] Direct costs encompass medical consultations, imaging, and therapeutic interventions, whereas indirect costs arise from lost productivity, work absenteeism, and premature retirement from the workforce.[4]

Chronic low back pain (CLBP), defined as pain persisting for ≥ 12 weeks,[1] is the most burdensome phenotype. Unlike acute LBP, which stems solely from tissue injury, CLBP reflects biological, psychological, and social factors that perpetuate pain beyond normal healing timescales.[5] The biopsychosocial model shows that pain emerges from nociceptive, affective, cognitive, and contextual factors.[6] Loeser's framework describes pain as layers of nociception, perception, suffering, and behavior.[6] Psychological factors, such as depression, anxiety, catastrophizing, and fear-avoidance beliefs, predict CLBP chronicity and poor treatment outcomes.[7]

The multidimensional nature of CLBP necessitates patient-reported outcome measures (PROMs) that simultaneously capture the biological, psychological, and social domains to support comprehensive clinical decision-making. The Back Bournemouth Questionnaire (BBQ), developed by Bolton and Breen in 1999,[8] was designed specifically to meet this requirement. The BBQ comprises seven items evaluating pain intensity, functional disability, social participation, anxiety, depression, fear-avoidance beliefs, and locus of control, each scored on an 11-point numerical pain rating scale (NPRS; 0-10), yielding a total score between 0 and 70, where higher scores indicate greater biopsychosocial impact.[8] The instrument has demonstrated excellent psychometric properties in its original English version and has been successfully validated across several languages, including German,[9] Danish,[10] Brazilian,[11,12] Turkish,[13] and Arabic.[14]

Cross-cultural adaptation of PROMs extends beyond mere linguistic translation. Guillemin *et al.*[15] and Beaton *et al.*[16] established that successful adaptation must demonstrate semantic, idiomatic, experiential, and conceptual equivalence with the source instrument, and that measurement properties must be re-established in the target population. These principles are widely regarded as the gold standard for health measurement adaptation.

Gujarati is spoken by more than 55 million people in India, with Gujarat, a state of over 60 million, using Gujarati as the primary

medium of clinical communication.[17] Despite this significance, no validated Gujarati BBQ existed before this study, forcing clinicians to use English questionnaires or informal translations. This practice risks item miscomprehension, inaccurate self-reporting, and unreliable data. The feasibility of Gujarati PROM adaptation has been demonstrated through validated versions of the Gujarati Oswestry Disability Index (ODI-G),[18] Gujarati Roland-Morris Disability Questionnaire (RMDQ-G),[19] Gujarati Fear-Avoidance Beliefs Questionnaire (FABQ-G),[20] and Gujarati Patient Health Questionnaire-9 (PHQ-9-G).[21]

Therefore, the present study aimed to (1) cross-culturally adapt the BBQ into Gujarati following the six-step methodology of Beaton *et al.*,[16] and (2) evaluate the reliability, validity, and factor structure of the resulting Gujarati Back-Bournemouth Questionnaire (BBQ-G) in Gujarati-speaking adults with CLBP.

METHODS

Study Design

This investigation employed a methodological study design comprising two sequential phases. Phase I encompassed the cross-cultural adaptation of English BBQ into Gujarati. Phase II involved the systematic psychometric evaluation of the BBQ-G. Ethical approval was obtained from the Institutional Ethics Committee of Sarvajanik College of Physiotherapy, Surat (Reference No. SMT/SCOP/IEC/24-25/692; dated December 16, 2024). Written informed consent was obtained from all participants in the Gujarati language prior to enrolment, ensuring comprehension and voluntary participation. The study was conducted over a one-year period.

Participants and Sampling

Participants were recruited using purposive sampling from the musculoskeletal physiotherapy outpatient department (OPD) of Sarvajanik College of Physiotherapy and affiliated clinics in Surat City, Gujarat, India. Eligible participants were Gujarati-speaking adults aged 25–60 years with confirmed CLBP, defined as pain lasting > 12 weeks, as diagnosed by an orthopaedic surgeon, and who reported a numerical pain rating scale (NPRS) score above five, indicating moderate pain intensity. Both sexes were included, and Gujarati literacy was required for independent questionnaire completion.

Participants were excluded if they had a prior spinal surgery, spinal or systemic malignancy, active infection, cardiovascular or respiratory conditions limiting activity, systemic inflammatory joint disease, cognitive impairment affecting questionnaire comprehension, or significant communication difficulties.

The sample size was determined using G*Power (version 3.1.9.4),[22] based on a correlational design with a small effect size (r=0.20), alpha level (alpha=0.05), and power (1-beta=0.80), yielding a minimum required sample size of 150 participants. For test-retest reliability, a subsample of 30 participants with stable conditions completed the BBQ-G twice over 48 h, with no intervention during this period.

Phase I: Cross-Cultural Adaptation

The adaptation process was conducted in strict accordance with the six-step guidelines of Beaton *et al.*[16][3], following written permission from the original instrument authors. Step 1 (forward translation): Two independent bilingual translators, both native Gujarati speakers, produced separate forward translations of the English BBQ, designated T1 and T2. One translator was a healthcare professional familiar with the measured constructs, and the other was a non-medical professional to minimize conceptual bias. Step 2 (Synthesis): A reconciliation meeting between both translators and the principal investigator resolved discrepancies and produced a single synthesized version (T-12). Step 3 (Back-Translation): Two independent English-native translators, blinded to the original instrument, independently back-translated T-12 into English (BT1 and BT2) to identify conceptual inconsistencies. Step 4 (Expert Committee Review): A multidisciplinary expert committee comprising physiotherapists, orthopaedic surgeons, physicians, and a psychiatrist evaluated all versions for semantic, idiomatic, experiential, and conceptual equivalence, resolving remaining discrepancies to produce a pre-final Gujarati version. Step 5 (Pre-Testing and Cognitive Debriefing): The pre-final version was administered to 20 Gujarati-speaking patients with CLBP. Structured individual interviews confirmed that participant interpretations aligned uniformly with the intended construct meanings; minor

wording refinements were incorporated, and the pre-final version was accepted as the final BBQ-G. Step 6 (Documentation): All procedural records were compiled and submitted to the original developers, confirming adherence to the adaptation protocol.[15,16]

Phase II: Outcome Measures

BBQ-G (seven items; total score, 0-70) served as the primary instrument under evaluation. Higher scores indicated greater biopsychosocial impact. The NPRS (11-point scale; 0=no pain, 10=worst imaginable pain; minimal clinically important difference [MCID]=2 points[23]) measured pain intensity. The validated FABQ-G[20] (16 items; 0-6 Likert scale; two subscales for physical activity and work) assessed fear-avoidance beliefs related to back pain. The RMDQ-G[19] (24 binary items; score range, 0-24) quantified functional disability. The PHQ-9-G[21] (9 items; score, 0-27) evaluated depressive symptom severity. All Gujarati instruments had been validated in musculoskeletal clinical populations.

Statistical Analysis

All analyses were performed using IBM SPSS Statistics (version 20.0), with a significance threshold of $p<0.05$ and 95% confidence intervals maintained throughout. Face validity was assessed through structured participant feedback on item clarity, relevance, and comprehensibility during pretesting. Content validity was quantified by computing item-level content validity indices (ICVI) and the scale-level content validity index averaged across experts (SCVI/Ave) from a 20-expert panel using a 7-point Likert scale; scores of 5–7 were considered acceptable.[24]

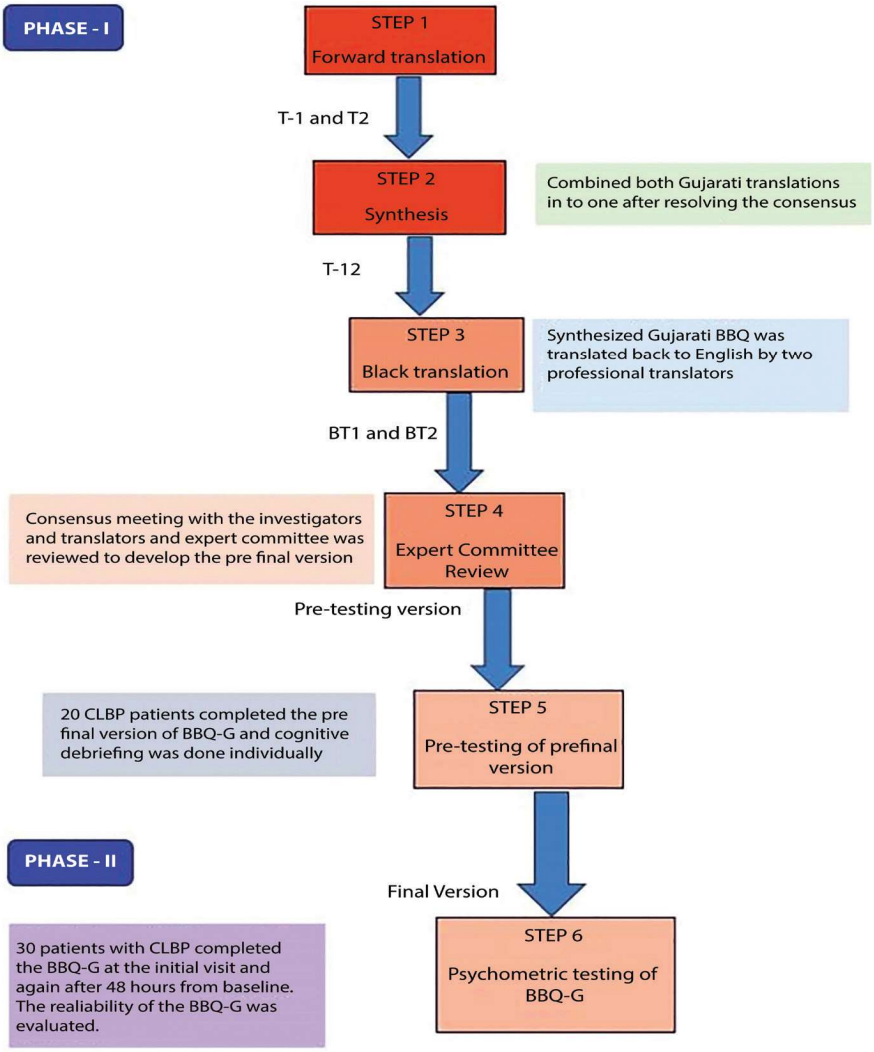


Figure 1: Flowchart of the study design of BBQ-G

Internal consistency was assessed using Cronbach's alpha, with values of 0.70 or above considered acceptable.[25] Test-retest reliability was quantified using the intraclass correlation coefficient (ICC; two-way mixed model, absolute agreement), interpreted as follows: ≥ 0.90=very high; 0.70–0.89 =high; and 0.50–0.69 =moderate.[26] Measurement agreement was assessed using Bland–Altman analysis,[28] reporting the mean difference (bias) and 95% limits of agreement (LOA). The standard error of measurement and the minimal detectable change at 95% confidence level were calculated to characterize measurement precision.[24]

Construct validity was evaluated using Pearson's correlation coefficient (r). Convergent validity was assessed against the FABQ-G (a conceptually related construct), and divergent validity against the NPRS, RMDQ-G, and PHQ-9-G (related but conceptually distinct constructs). Correlation coefficients were classified as follows: 0.00–0.19 =very weak; 0.20–0.39 =weak; 0.40–0.69 =moderate; and 0.70–0.89 =strong.[27] Exploratory factor analysis (EFA) using Principal Component Analysis (PCA) examined the underlying factor structure. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity assessed data suitability, and Kaiser's criterion (eigenvalue >1) guided factor retention.[28]

RESULTS

Participant Characteristics

A total of 150 participants with CLBP were enrolled in the study. The sample comprised 44 men (29.3%) and 106 women (70.7%), with a mean age of 41.95 ± 10.10 years (range: 25–60 years). The largest age cohort was 35–44 years (n=47; 31.3%), followed by 25–34 years (n=41; 27.3%), and 45–54 years (n=40; 26.7%). The mean height was 160.84 ± 9.96 cm and the mean weight was 71.78 ± 15.08 kg. Regarding occupation, the predominant category was housewives and homemakers (n=83; 55.3%), followed by skilled and unskilled laborers (n=24; 16.0%). Regarding BMI, 60 participants (40.0%) were classified as overweight, with an additional 26 (17.3%) in the obese Class I category. The baseline demographic and anthropometric characteristics are presented in Table 1.

Table 1: Baseline Demographic and Anthropometric Characteristics of Participants (N = 150)

Age (years), mean ± SD	41.95 ± 10.10
Age group, n (%)	
25–34	41 (27.3%)
35–44	47 (31.3%)
45–54	40 (26.7%)
55–60	22 (14.7%)
Sex, n (%)	
Male	44 (29.3%)
Female	106 (70.7%)
Height (cm), mean ± SD	160.84 ± 9.96
Weight (kg), mean ± SD	71.78 ± 15.08
Occupation, n (%)	
Housewives/Homemakers	83 (55.3%)
Skilled & Unskilled Labour	24 (16.0%)
Professional & Technical	17 (11.3%)
Business/Self-employed	13 (8.7%)
Service/Government/Office	8 (5.3%)
Others	5 (3.3%)
BMI category, n (%)	
Underweight (<18.5)	4 (2.7%)
Normal Weight (18.25–24.9)	44 (29.3%)
Overweight (25.0–29.9)	60 (40.0%)
Obese Class I (30.0–34.9)	26 (17.3%)
Obese Class II (35.0–39.9)	13 (8.7%)
Obese Class III (>=40)	3 (2.0%)

Descriptive Statistics of Outcome Measures

The mean BBQ-G total score was 35.83 ± 9.90 (range: 15–62), indicating a moderate-to-substantial level of multidimensional CLBP burden across the sample, with considerable interindividual variability. The mean NPRS score was 6.21 ± 1.16, reflecting moderate-to-high pain intensity in the majority of participants, consistent with the inclusion criterion of NPRS >5. A mean FABQ score of 49.12 ± 10.42 indicated moderately elevated fear-avoidance beliefs, whereas the mean RMDQ score of 14.04 ± 3.86 reflected moderate functional disability. A mean PHQ-9 score of 12.88 ± 4.65 indicated the presence of moderate depressive symptoms in this population. Descriptive statistics for all outcome measures are summarized in Table 2.

Table 2: Descriptive Statistics of Outcome Measures at Baseline (N = 150)

Outcome Measure	Mean +/- SD	Minimum	Maximum
BBQ Total Score	35.83 +/- 9.90	15	62
NPRS	6.21 +/- 1.16	5	9
FABQ	49.12 +/- 10.42	14	66
RMDQ	14.04 +/- 3.86	7	21
PHQ-9	12.88 +/- 4.65	3	24

Phase I: Cross-Cultural Adaptation Outcomes

The six-step adaptation process was completed without encountering major conceptual or linguistic difficulties. Discrepancies between the two forward translations were minimal and resolved expeditiously during the synthesis meeting, yielding a coherent T-12 version. The back-translation confirmed adequate conceptual equivalence between the Gujarati synthesized version and the original English instrument, with no items requiring substantial reformulation. The expert committee review resulted in minor wording refinements to enhance idiomatic naturalness within the Gujarati cultural context without altering the construct meaning of any item. Cognitive debriefing with 20 patients confirmed that all items were interpreted consistently with the intended meaning; therefore, the pre-final version was accepted as the final BBQ-G without further modification.

Content and Face Validity

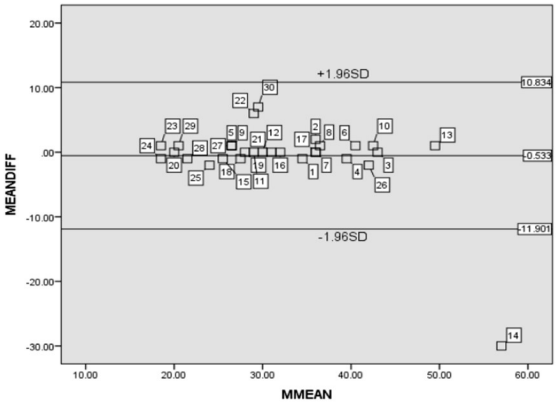
All seven BBQ-G items achieved I-CVI values ranging from 0.80 to 1.00, satisfying the acceptability criterion. The overall S-CVI/Ave was 0.95, substantially exceeding the recommended minimum threshold of 0.80, confirming strong consensus among the expert panel regarding the content relevance, clarity, and representativeness of all items. Participants who completed the instrument during pretesting reported that all items were clear, relevant, and pertinent to their pain-related daily experiences. No item was identified as confusing, ambiguous, or culturally inappropriate for the target population, supporting the face validity of the BBQ-G.

Reliability

Internal consistency analysis, based on all 150 participants, yielded a Cronbach's alpha of 0.82, indicating good item homogeneity. Test-retest reliability, assessed in 30 clinically stable participants over a 48-hour interval, yielded an ICC of 0.820 (95% CI: 0.656–0.910), classified as high reproducibility. Bland–Altman analysis demonstrated a mean difference of − 0.53 with 95% LOA of − 11.90 to 10.83, indicating minimal systematic bias and satisfactory score stability across repeated assessments (Graph 1). The SEM was calculated as approximately 4.19 points. The MDC95 was approximately 12 points, representing the minimum change in BBQ-G score required to confirm a genuine clinical change beyond measurement error. Reliability data are presented in Table 3.

Table 3: Test-Retest Reliability of the Gujarati Back Bournemouth Questionnaire (BBQ-G; n = 30)

Measure	Baseline Mean +/- SD	Retest Mean +/- SD	ICC (95% CI)	Bland-Altman: d (LOA)
BBQ-G	35.83 +/- 9.90	32.17 +/- 10.96	0.820 (0.656-0.910)	-0.53 (-11.90 to 10.83)



Graph 1: Bland and Altman plot for measuring the limits of agreement

Construct Validity

All Pearson's correlation coefficients between the BBQ-G total score and the four comparator instruments were statistically significant ($p < 0.001$). The strongest positive association was observed with the NPRS ($r=0.679$; strong correlation), followed by PHQ-9-G ($r=0.495$; moderate), FABQ-G ($r=0.431$; moderate), and RMDQ-G ($r=0.415$; moderate), a pattern consistent with a priori hypotheses regarding the multidimensional construct coverage of the BBQ-G. Among the cross-correlations between comparator instruments, the highest coefficient was observed between PHQ-9 and RMDQ ($r=0.466$), followed by RMDQ and FABQ

(r=0.422), and PHQ-9 and FABQ (r=0.345). The NPRS demonstrated low-to-moderate correlations with PHQ-9 (r=0.331), RMDQ (r=0.320), and FABQ (r=0.344). Construct validity results are presented in Table 4.

Table 4: Pearson Correlation Matrix: BBQ-G Total Score and Comparator Measures (N = 150)

Variable	r with BBQ-G	p-value	Strength	Validity Type
NPRS	0.679	<0.001	Strong	Divergent
PHQ-9-G	0.495	<0.001	Moderate	Divergent
FABQ-G	0.431	<0.001	Moderate	Convergent
RMDQ-G	0.415	<0.001	Moderate	Divergent

Note: NPRS, numerical pain rating scale; FABQ-G, fear-avoidance beliefs questionnaire-Gujarati; RMDQ-G Roland, Morris disability questionnaire-Gujarati; PHQ-9-G, patient health questionnaire-9-Gujarati. All p<0.001.

Factor Analysis

The KMO measure of sampling adequacy was 0.839, falling within the meritorious range, and Bartlett's test of sphericity was statistically significant ($\chi 2$ =682.000, df=21, p<0.001), confirming the suitability of the dataset for factor analysis. PCA yielded a single component with an eigenvalue of 4.272, explaining 61.029% of the total variance. All remaining six components produced eigenvalues below 1.0 and were therefore not retained according to Kaiser's criterion. The scree plot demonstrated a pronounced inflection point immediately after the first component, with a plateau thereafter, corroborating the retention of a single dominant factor and confirming a predominantly unidimensional structure for the BBQ-G. Item communalities ranged from 0.386 (BBQ-7; locus of control) to 0.746 (BBQ-5; depression), with most items demonstrating adequate to high shared variance with the extracted factor. Factor analysis results are presented in Table 5.

Table 5: *Factor Analysis Results: KMO, Bartlett's Test of Sphericity, and Principal Component Summary*

	KMO	Bartlett's Test	Eigenvalue (C1)	Variance Explained
Value	0.839	Chi-sq=682.000, df=21, p<0.001	4.272	61.029%

Item Communalities (Extraction values, principal component analysis):

BBQ_1	BBQ_2	BBQ_3	BBQ_4	BBQ_5	BBQ_6	BBQ_7
0.532	0.702	0.578	0.741	0.746	0.587	0.386

DISCUSSION

Cross-Cultural Adaptation

The BBQ was adapted into Gujarati following Beaton *et al.*,[16] five-step methodology and Guillemin *et al.*,[15] guidelines, which represent the gold standard for cross-cultural adaptation of health instruments. This approach preserved four dimensions of equivalence: semantic, idiomatic, experiential, and conceptual. The methodology aligns with previous BBQ adaptations in Turkish,[13] Arabic,[14] Brazilian,[11] German,[9] and Danish (10), enabling psychometric comparisons and confirming the cross-cultural transferability of the BBQ's biopsychosocial constructs.

The current adaptation encountered minimal conceptual difficulties. Cognitive debriefing with 20 patients showed consistent alignment between participant interpretations and intended item meanings, reflecting the quality of the translation and back-translation processes. Only minor wording refinements were needed before finalizing the BBQ-G. This aligns with Kamonseki *et al.*,[11] who reported >90% comprehension during the pre-testing of the Brazilian Portuguese BBQ, supporting the BBQ's linguistic transferability into Gujarati.

Sample Characteristics

The mean participant age of 41.95 years aligns with evidence showing that peak CLBP disability burden occurs between the ages of 40 and 60, reflecting occupational exposure effects through middle age (29, 30). The predominance of female participants (70.7%) matches findings that women face higher CLBP prevalence and disability, which increases with age.[30] The high

proportion of housewives (55.3%) is relevant, as domestic work involves repetitive lumbar loading through flexion, lifting, and static postures that increase musculoskeletal risk.[31]

The BMI distribution (40.0% of participants classified as overweight and 28.0% across obesity classes) warrants consideration. Elevated BMI is associated with increased axial loading on lumbar vertebrae and discs, altered spinal biomechanics, and heightened proinflammatory systemic activity, which may contribute to CLBP development and persistence.[32] This profile reflects the CLBP patient population in Gujarati physiotherapy settings and supports the ecological validity of the study sample.

Reliability

Cronbach's alpha of 0.82 for the BBQ-G exceeds the accepted threshold of 0.70 for adequate internal consistency,[25] confirming satisfactory item homogeneity across the seven biopsychosocial domains. While this value is below the alpha reported for the Turkish BBQ adaptation (alpha=0.914),[13] it aligns with the instrument's multidimensional design, which spans distinct biopsychosocial constructs rather than measuring a single homogeneous domain. A lower alpha in such instruments may reflect construct heterogeneity rather than item deficiency.[25]

The ICC of 0.820 (95% CI: 0.656-0.910) shows high reproducibility of the BBQ-G, confirming stability in clinically stable patients over 48 hours. Similar reproducibility was reported for the Turkish adaptation (ICC: 0.851-0.927)[13] and Danish version,[10] supporting cross-linguistic stability of the instrument. Bland Altman analysis showed a mean difference of –0.53 between test and retest occasions, which is negligible relative to the 70-point range, and a 95% LOA of –11.90 to 10.83, indicating no systematic directional bias and acceptable score variability.[33]

The MDC95 of 12 points provides clinicians with an evidence-based threshold for distinguishing clinical change from measurement noise.[34] Bolton JE[35] identified that a 13-point change, or 36% reduction in BBQ score, constitutes a clinically meaningful improvement. The concordance between the MDC95 of the BBQ-G (12 points) and this MCID suggests that the BBQ-G is sensitive to detecting clinically important treatment effects and is appropriate as an evaluative tool in longitudinal physiotherapy interventions.[36]

Content Validity

The S-CVI/Ave of 0.95 surpasses the recommended threshold of 0.80,[24] reflecting strong consensus among the 20-member expert panel on item relevance, clarity, and construct representativeness. I-CVI values spanning 0.80 to 1.00 confirm that no item was deficient in content adequacy. The expert panel composition including physiotherapists, orthopaedic surgeons, general surgeons, a psychiatrist, a psychologist, a nurse, and educators ensured that content adequacy was evaluated across the biopsychosocial domains of the BBG-G, lending credibility to these findings.

Construct Validity

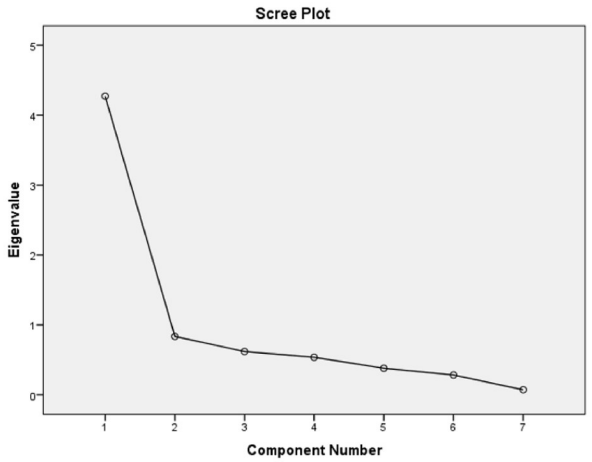
The correlation pattern between BBQ-G and the four comparator instruments aligns with the instrument's theoretical framework and confirms convergent and divergent validity. The strong positive correlation with NPRS (r=0.679) is expected, as pain intensity is one of the seven domains measured by BBQ-G; this magnitude matches correlations in the Turkish[13] and Arabic[14] adaptations. The moderate correlations with PHQ-9-G (r=0.495), FABQ-G (r=0.431), and RMDQ-G (r=0.415) reflect BBQ-G's multidimensional structure, incorporating psychological and functional constructs as interrelated domains.

Convergent validity was supported by a moderate correlation between the BBQ-G and FABQ-G (r=0.431), consistent with the fear-avoidance beliefs items within the BBQ-G. Divergent validity was demonstrated by moderate correlations with the PHQ-9-G (r=0.495) and RMDQ-G (r=0.415), demonstrating that the BBQ-G measures constructs related to, yet distinct from, those captured by these individual-domain instruments.

Factor Analysis

The EFA yielded a dominant component with an eigenvalue of 4.272, accounting for 61.029% of the total variance. Kaiser's criterion and scree plot supported the retention of this single factor (Graph 2). Although the BBQ spans seven biopsychosocial domains, the unidimensional

solution aligns with the concept that these domains reflect an overarching construct of multidimensional pain-related disability.[8] Item communalities ranging from 0.386 to 0.746 indicate that all items contribute meaningfully to the extracted factor, although BBQ-7 (locus of control; communality=0.386) showed lower shared variance, consistent with its distinct cognitive attribution construct. these domains are inherently interconnected in clinical populations. Previous cross-cultural adaptations, including the Turkish[13] and Arabic[14] versions, have also reported a unidimensional factor structure for the back version of the questionnaire, thus, supporting the presence of a dominant underlying construct.



Graph 2: Scree plot

Clinical Implications

BBQ-G addresses a critical void in Gujarati-language clinical assessment. Its brevity (seven items, approximately five minutes to administer) makes it practical for routine physiotherapy assessments. The instrument enables the standardized evaluation of CLBP across biopsychosocial dimensions, facilitating treatment that addresses psychological and social factors alongside physical impairments. The MDC95 threshold of 12 points allows clinicians to evaluate treatment efficacy. BBQ-G enables Gujarati-speaking patients and clinicians to participate in multicenter CLBP research, contributing to standardized outcome data across Indian physiotherapy settings. BBQ-G, alongside existing validated Gujarati instruments (ODI-G, RMDQ-G, FABQ-G, and PHQ-9-G), provides a comprehensive outcome battery for CLBP assessment.[18-21]

Limitations

This study had several limitations. Data collection was limited to physiotherapy and orthopaedic clinics in Surat City, limiting generalizability to other Gujarat districts, rural populations, and the Gujarati-speaking diaspora. Purposive sampling may have introduced selection bias. The study did not assess BBQ-G's responsiveness over treatment or criterion validity against standard measures.[37] Future studies should assess longitudinal responsiveness, determine population-specific MCIDs, evaluate criterion validity, and recruit participants from across Gujarat districts to strengthen external validity.

CONCLUSION

The Gujarati Back Bournemouth Questionnaire (BBQ-G) has been developed through a systematic cross-cultural adaptation process and demonstrates excellent content validity, good internal consistency, acceptable test-retest reliability, and construct validity. The instrument's unidimensional factor structure and clinically interpretable MDC95 of approximately 12 points confirm its suitability as an evaluative tool in physiotherapy practice and musculoskeletal research.

The BBQ-G is now available as a validated, culturally appropriate instrument for the standardized assessment of the biopsychosocial impact of CLBP in Gujarati-speaking adults, addressing a gap in the Indian physiotherapy PROM landscape.

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