

Abstract

Translation, cross-cultural adaptation, and validation of a Gujarati version of a brief illness perception questionnaire in people with intermittent claudication.

Background

To assess an individual's cognitive and emotional representation of illness, a translated, culturally adapted brief illness perception questionnaire (B-IPQ) is needed.

Objective

This study assessed the content validity and face validity of a Gujarati version of a B-IPQ questionnaire.

Methods

A forward–backward translation of the 9-item B-IPQ was applied using a standardized approach. The translated versions were compared with the original questionnaire, and 10 experts rated each item according to the following criteria: clarity, semantic equivalence, appropriateness, and cultural relevance. Data were analyzed by calculating the content validity and universal agreement between experts. Face validity was assessed using a think-aloud approach with 10 patients with intermittent claudication. This cognitive interviewing approach asked participants to describe their thoughts while completing the questionnaire to explore the comprehensibility and clarity of the translated questionnaire. Responses were analyzed using deductive thematic analysis.

Results

There was a complete agreement between experts for 8/9 items (I-CVI=1.00), leading to an overall agreement (S-CVI/Ave) of 0.98. There was an excellent agreement between experts (UA=0.88). For face validation, our participants encountered only minor problems understanding some of the questions, and the Gujarati B-IPQ was considered to have good face validity.

Conclusion

B-IPQ questionnaire had excellent content validity and good face validity and will enable illness perception to be assessed in people with IC.

Key words

Illness perception, content validation, intermittent claudication

Title

Translation, cross-cultural adaptation, and validation of a Gujarati version of a brief illness perception questionnaire in people with intermittent claudication

Introduction

Peripheral artery disease (PAD) is a condition caused by the accumulation of plaque in the arteries of the peripheral vasculature, which causes narrowing or blockages in the arteries of the lower limbs.⁽¹⁾ Leg pain while walking is the most common symptom of PAD, termed intermittent claudication (IC). IC affects walking distance, capacity, physical activity, social function, emotional well-being, and mental health^(2,3). In India, the prevalence of PAD ranges from 7.6% to 26.7%, and it is under-recognized and undertreated compared to cardiovascular diseases.⁽⁴⁾

Alongside optimal medical therapy, supervised exercise programs are recommended in people with PAD to improve symptoms and functional quality of life.^(5,6) However, participation in supervised exercise programs tends to be low.^(7,8) This may be due to lack of time, costs, or low motivation.⁽⁸⁾ Psychological factors such as beliefs about the impact of walking on health, lack of understanding of walking guidance, and beliefs about disease severity influence how people manage their PAD and IC and adhere to treatment such as completing walking exercise.^(6,9,10)

How people make sense of their condition and symptoms (i.e. their illness perceptions or representation) are associated with adherence to cardiac rehabilitation in people with coronary heart disease^(11,12) and walking ability in people with PAD.⁽¹³⁾

The Common Sense Self- Regulation Model of illness representation(CSM)^(14,15) proposes that individuals make an effort to understand their illness and symptoms and engage in coping behaviours such as walking exercise that aligns with their perceptions about the illness timeline (whether it is acute, chronic, or cyclical), consequences (perceptions about illness severity), controllability (self- or treatment-efficacy to control or cure the illness), and coherence (perceived understanding and plausibility of the illness representation). Consistent associations were found between illness perceptions, coping strategies, and physical and psychological health outcomes in individuals with long-term illnesses. Additionally, these perceptions predicted attendance at cardiac rehabilitation, although the effects were minor.⁽¹⁴⁾ Understanding an individual's perceptions of their illness and symptoms is important as inaccurate perceptions need to be addressed to improve and adherence to treatment. Three questionnaires have been developed to assess illness perceptions, (Illness Perception Questionnaire (IPQ)⁽¹⁵⁾, Revised Illness Perception Questionnaire(IPQ-R)⁽¹⁶⁾, and Brief Illness Perception Questionnaire(B-IPQ)⁽¹⁷⁾).

The B-IPQ uses a single-item scale approach to assess perceptions. It is ideal for patients who are elderly or very ill as it is less demanding and quicker to complete. It may also be more suitable for those with limited reading and writing abilities. A shorter questionnaire allows for investigating illness perceptions in a broader range of patient groups.⁽¹⁶⁾

The B-IPQ has been validated in 36 countries concept including Australia, Colombia, New Zealand, Germany, Portugal, China, Taiwan, Singapore, and Japan.⁽¹⁷⁾ To date, no studies have translated, culturally adapted or assessed comprehensibility of the B-IPQ in an Indian population with PAD.

Materials and methods

Study Design

Ethical approval was obtained for this translation, cross-cultural adaptation, and validation study from the Institutional Ethics Committee_CHARUSAT(ARIP/IRB/22/18) on 07/09/2022. Permission to translate and culturally adapt the questionnaire into the Gujarati language was obtained from the questionnaire's original developers.

Measures

Brief illness perception questionnaire

The B-IPQ is a nine-item self-reported questionnaire.⁽¹⁶⁾ It includes eight items assessing cognitive illness representation and emotional representation. Five of the items assess cognitive illness representations: consequences (Item 1), timeline (Item 2), personal control (Item 3), treatment control (Item 4), and identity (Item 5). Two items assess emotional representations: concern (Item 6) and emotions (Item 8). One item assesses illness comprehensibility (Item 7). All items except the causal question are rated using a 0-to10 response scale. One open-ended question assesses the causal representation adapted from the IPQ-R, which asks patients to list the three most important causal factors in their illness (Item 9).

To score the B-IPQ questionnaire, each item is rated on a continuous linear scale (0-10) scale, with higher scores indicating a more threatening perception of the illness. The total score is calculated by summing the scores of all eight items, with a possible range of 0-80. Higher scores indicate more negative illness perception.

Phase 1: Cross-cultural adaptation procedure

The B-IPQ questionnaire was translated and culturally adapted from English to Gujarati language, following standard guidelines.⁽¹⁸⁾

Participants for cross-cultural adaptation

The translation process involved four translators (two forwards, two backward translators), and a consensus meeting including experts with different backgrounds and expertise.

For the translation process, one of the forward translators was a native Gujarati speaker. They had a Master of Arts in English literature and provided a translation that reflected the language used by most Gujarati people. They had no clinical training and were not familiar with the concepts being translated. The second forward translator was a cardiorespiratory specialist physiotherapist with 15 years of experience of treating patient with IC. They had a research doctorate and provided translations with a clinical perspective.

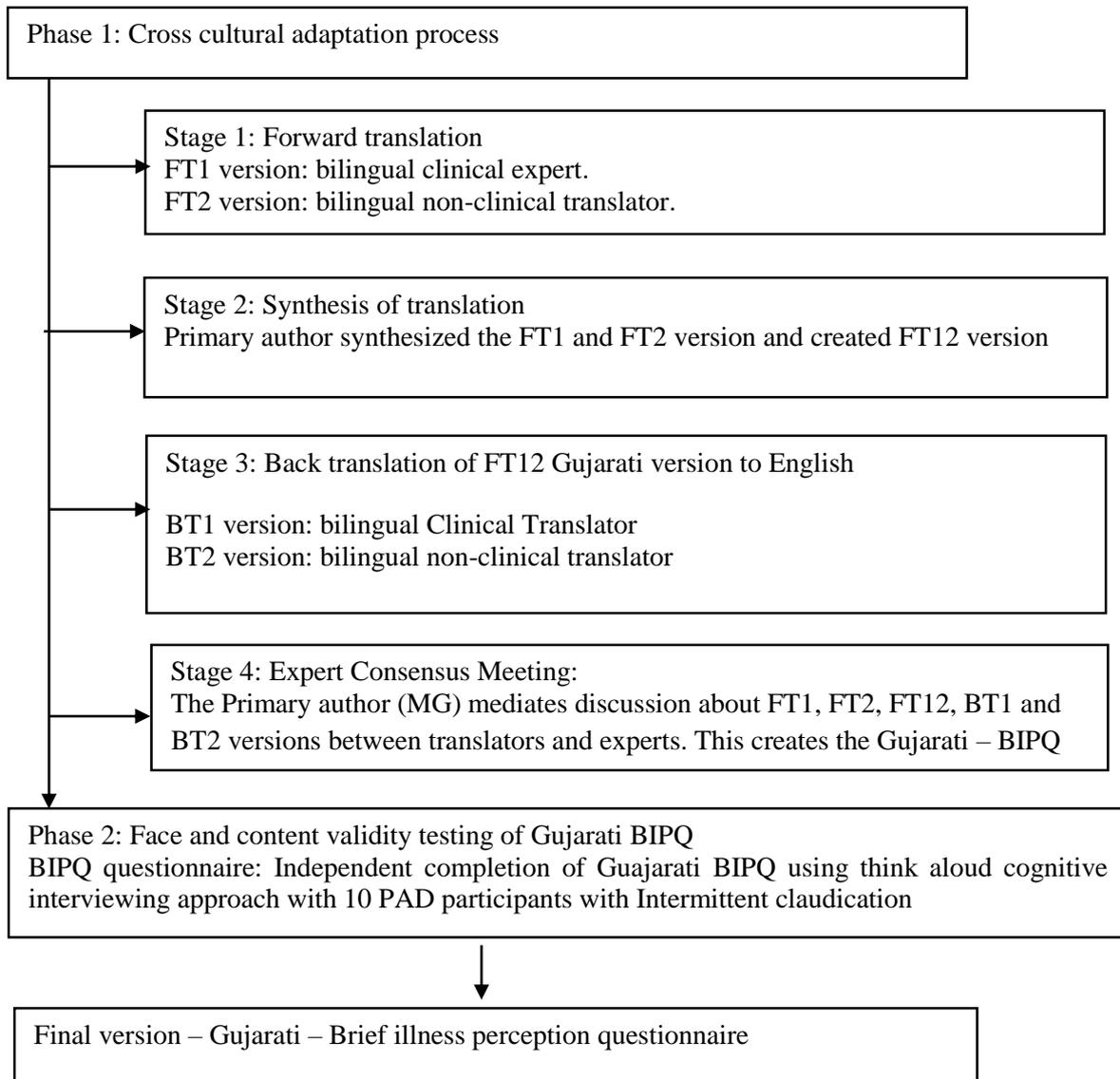
The two independent back translators were native Gujarati speakers and were fluent in both languages as they had lived in Gujarat for over 20 years. One of the back translators had a background in English literature, while the other was a cardiopulmonary physiotherapist and had treated patients with IC for at least a decade. Neither of the back translators were familiar with the concepts they were translating.

The six additional experts who attended the consensus meeting included four academic physiotherapists, each with 15 years of experience in cardiorespiratory physiotherapy, and two physiotherapists with 15 years of clinical experience in treating patients with cardiovascular diseases and IC.

Process for cross-cultural adaptation

Stage 1 Forward Translation: The English version of BIPQ was translated and cross-culturally adapted into Gujarati using a standardized translation method (figure 1)^(18,19). To create BIPQ versions of Forward Translation 1 (FT1) and Forward Translation (FT2), two native Gujarati speakers individually translated the questionnaire from English into Gujarati.

No explanation of the questionnaire items was provided to the non-clinical translator to encourage using routinely used language and expressions in the translation.



Abbreviations

FT1 – Forward Translation 1, FT2- Forward Translation 2, FT12 – Forward Translation 12, BT1 – Backward Translation 1, BT2- Backward Translation 2, PAD- Peripheral Artery Disease, B-IPQ –Brief Illness Perception Questionnaire

Figure 1: Cross-cultural translation and cultural adaptation of brief illness perception questionnaire from the English language to Gujarati

Stage 2: Synthesis of translation: The primary author (MG) evaluated the two Gujarati translations as part of the synthesis process to identify any discrepancies and inconsistencies

in the words and phrases between the two translations (FT1 and FT2). At a meeting with both forward and backward translators and primary author, discrepancies between the translated version and the original measurements were compared. The most accurate forward translation 12 “FT12” of the original text, was developed after discussion.

Stage 3: Back translation: The two back translator translated the FT12 version and created Back Translation 1 (BT1) and Back Translation 2 (BT2) versions. These two translators were not familiar with the original questionnaire. The primary author (MG) evaluated BT1 and BT2 and summarized any disparities.

Stage 4: Expert consensus meeting: Ten attendees, including two forward translators, two backward translators, and six senior clinicians. To compare each translated version (FT1, FT2, FT12, BT1, BT2) with the original English questionnaire. Questionnaires versions were compared to identify any differences, to ensure that they conveyed the same concept and prevent any possible misunderstandings. They also confirmed that the language used in the instructions, questions, and answer options had consistent meanings in both cultures. They reviewed each question and scored it as 1 = rejected (discrepancies questions identified), 2=accepted with modification, and 3 = accepted (no discrepancies identified). The decision to achieve equivalence between the translated and original versions was analyzed using the content validation ratio (CVR) and content validation index (CVI)⁽²⁰⁾.

Phase 2: Face and content validation

Participants for face and content validation

Study design: The content validity and comprehensibility of Gujarati BIPQ were explored using a cognitive interviewing approach (‘Think Aloud’)^(19,21).

Participants: An arbitrary sample of 10 people were recruited from one vascular clinic in Gujarat, Western India. People aged at least 18 years with PAD (diagnosed either by an Ankle Brachial Pressure Index ≤ 0.90 in their most symptomatic leg at rest, angiography or computed tomography (CT) scans) and self-reported IC (assessed using San Diego Claudication Questionnaire (SDCQ))⁽²²⁾ were recruited. Patients were excluded if they were not fluent in written and spoken Gujarati language, unable (e.g., cognitive impairment) or refused to provide informed consent. All participants received verbal and written information about the study and provided written informed consent.

Process for face and content validation

The primary author applied a "think aloud" cognitive interviewing technique to conduct in-person, individual audio-recorded interviews with each participant.

Prior to the start of the interview, they were given the instructions, adapted from the protocol described by Green and Gilhooly⁽²³⁾. Participant were asked to share their thoughts whilst completing the questionnaire without needing to explain their response to questions. (full instructions available in Annexure 1). As participants completed the questionnaire, if they were silent for more than 10 seconds, they were prompted to continue to share their thoughts about the questionnaire items.

Analysis

The study populations were characterized using descriptive statistics. Cross-cultural adaption of the questionnaire used quantitative and qualitative analyses.

Quantitative analysis of content validation. The Content Validity Index (CVI) and item level content validity (I-CVI) is calculated as the proportion of content experts allocating an item a relevance rating of 3 or 4. The universal agreement (UA) is assigned to the item that achieved

percentage of experts in agreement. The scale –content validity index (S-CVI/Ave) is the average of the I-CVI score for all items on the questionnaire or the average of proportion relevance judged by all experts. The proportion relevant is the average of relevance rating by individual experts. These were calculated to give an overview of the content validity of the questionnaire and one portion agreement method between content experts.^(20,23)

Face validation qualitative analysis: Audio recordings were transcribed verbatim and analyzed thematically using the software package N-Vivo (Lumivero's version 14). Each response was categorized into one of five groups, derived from the classifications used by French et al. in 2007.⁽²⁴⁾ These categories were defined as

- (1) No signification problems were identified
- (2) Participant reread the question or seriously stumbled in answering it (i.e., stammered or stuttered because of misreading) or (problems understanding the question),
- (3) Difficulty generating an answer
- (4) Questioned content of an item (identified problems with how the question was worded or queried the meaning of the question), or
- (5) Answered a different question from the one asked or gave reasoning inconsistent with the answer given (problems in comprehending/answering question, misinterpretation of question).

All transcripts were coded by one researcher. To ensure consistency, four transcripts were coded independently by a second assessor. If there were any coding discrepancies, these were discussed and applied to the coding of the other transcripts.^(23,25) Since the responses may have been categorized into numerous categories, percentage agreement was used to assess reliability

of coding. A percentage agreement ranging from 75 to 90 % indicates an acceptable level of inter-rater reliability.⁽²⁶⁾

Results

Cross-cultural adaptation findings

During the consensus meeting, there was complete agreement between experts for 8/9 questions (I-CVI=1.00), leading to an overall understanding (S-CVI/Ave) of 0.98 (Table 1).

There was excellent agreement between content experts (UA=0.88).

Table 1: Rating of the brief illness perception questionnaire by 10 experts

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	EXPERT IN AGREEMENT	I-CVI	UA
Q1	3	3	3	3	3	3	3	3	3	3	10	1	1
Q2	2	3	3	3	3	3	3	3	3	3	9	0.9	0
Q3	3	3	3	3	3	3	3	3	3	3	10	1	1
Q4	3	3	3	3	3	3	3	3	3	3	10	1	1
Q5	3	3	3	3	3	3	3	3	3	3	10	1	1
Q6	3	3	3	3	3	3	3	3	3	3	10	1	1
Q7	3	3	3	3	3	3	3	3	3	3	10	1	1
Q8	3	3	3	3	3	3	3	3	3	3	10	1	1
Q9	3	3	3	3	3	3	3	3	3	3	10	1	1
proportion relevance	0.88	1	1	1	1	1	1	1	1	1	S-CVI average based on I-CVI	0.98	0.88
											S-CVI average based on proportion relevance	0.98	

*E = Expert, I-CVI=Item level Content Validation Index, UA= Universal agreement, S-CVI-Scale Level Content Validation Index

In the meeting, queries were raised about the words “Brief” and “perception” in the title. The brief has two translations of Gujarati, one is “સંક્ષિપ્ત” and another is “ટૂંકી”. Where “સંક્ષિપ્ત” means brief and “ટૂંકી” means short. “સંક્ષિપ્ત” word was retained as it was closest to the original

title. The word perception was translated in “ધારણ”, “અનુભવ” and “મંજૂર”. The word “અનુભવ” means experience in English translation and “મંજૂર” means approved. As both these both words change the meaning of the questionnaire title. The word “ધારણ” was used for the Gujarati translation as it more accurately reflected the meaning of the original questionnaire. There were queries were raised about the grammatical errors only in one question and these were corrected in the final version. After inputting all the suggestions from the experts, a final Gujarati version was created and tested for face and content validation.

Face and content validation findings

Ten participants (8 males mean age (standard deviation) 57.8 (13.5) years were enrolled into the study. One participant had primary school education, 4 had secondary school education, and 5 had post-graduate education (Table 2). Recruitment was stopped after 10 participants as no new information was gathered after participant seven.⁽²⁷⁾

Table 2: Demographic Characteristics of Participants

Participant characteristics (n=10)		
Age (years)*	57.8(13.5)	
Gender	Male	8(80)
	Female	2(20)
Smoking History	yes	6(60)
	No	4(40)
Associated Comorbidities	yes	8(80)
	No	2(20)
Revascularization	yes	3(30)
	No	7(70)
Intermittent Claudication	Classic IC	8(80)
	Atypical IC	2(20)
Education level	Primary School	1(10)
	Secondary School	4(40)
	Post-Graduate	5(50)
All data Number(%) except *= Mean(Standard Deviation)		

Table 3: Frequency and type of problems identified for each of the questions of the Gujarati brief illness perception questionnaire

BIPQ construct	Item number	Questions	No signifi- cation proble ms identif ied n/10 %	Participants reread questions or seriously stumbled In reading n/10 %	Difficulty generating an answer n/10 %	Questione d content of the item n/10 %	Mis- interpretat ion of question n/10 %
Consequences	1	How much does your illness affect your life?	10 100%	0 00%	0 0%	0 0%	0 0%
Timeline	2	How long do you think your illness will continue?	10 100%	0 0%	0 0%	0 0%	0 0%
Personal Control	3	How much control do you feel you have over your illness?	9 90%	1 10%	0 0%	0 0%	0 0%
Treatment Control	4	How much do you think your treatment can help your illness?	10 100%	0 0%	0 0%	0 0%	0 0%
Identity	5	How much do you experience symptoms from your illness?	8 80%	2 20%	0 0%	0 0%	0 0%
Concern	6	How concerned are you about your illness?	10 100%	0 0%	0 0%	0 0%	0 0%
Illness comprehensibility	7	How well do you feel you understand your illness?	10 100%	0 0%	0 0%	0 0%	0 0%
Emotions	8	How much does your illness affect you emotionally? (e.g., does it make you angry, scared, upset, or depressed?)	10 100%	0 0%	0 0%	0 0%	0 0%

Table 3 summarizes the issues identified by participants for each question respective to each construct of the Gujarati B-IPQ.

In BIPQ, questions 1, 2, 3, 4 and 5 represents the cognitive illness representations and question 6 and 8 represents emotional representation and question 7 represents the comprehensibility.

Cognitive illness representation:

In the questions evaluating cognitive illness representations (questions 1-5), no participants had difficulty answering the items about illness consequences (Item 1), timeline (Item2), and treatment control (Item 4). This might be because they had gained enough knowledge about the disease consequences, treatment control, timeline from the doctor or the other medical personal and this may have influenced their belief about the effectiveness of the treatments offered. For example:

One participant answered question 1 (illness consequences)

“To what extent does your illness affect your life? It affects me a lot ...yes it is creating difficulty in walking. When I went to the follow up I was informed by the doctor that if I don’t take care then my activities may be affected. Today, I also came with my son for the follow-up. I have difficulty kicking the bike. I should give number 6.”

Another participant responded to question 2 (timeline)

“How long do you think the illness will last? For that, I will give 8, as per the doctor's advice, I am regular in medicine and all. But due to age as well as diabetes, it takes time to get well soon. I mean, I will have walking issues lifelong.”

One of the participants responded to question 4, (treatment control)

“How helpful do you think your treatment will cure your illness? For this I will give number eight.... treatment control ...ok its what’s going for my treatment now a days and how it is

effective.... than I have full faith in my doctor's treatment, they know my disease much better than me as well as according to everyone, if we take the medicine, the pain is relieved a lot. The disease also goes away and the effect is also very good, the pain is reduced, the difficulty in walking is also reduced. Difficulty getting up and down becomes less now."

Only two participants encountered issues, such as rereading questions or carefully considering them before answering, with question 3 (personal control) or question 5 (identity),

For question 3, this seemed to be because the participant thought their response depended on other information and participant had not responded to the numeral scale related to the question.

"How much control do you feel you have over your illness? Control means what I do for my health? May be it is asking about the food habit, or it may ask for exercise or medicine it is not written clearly in it. But still I can give.... here as I am doing yoga every day and I am taking regular medication."

Only one participant re-read question 5 (identity). This might be because of the late diagnosis of the disease or lack of knowledge of the disease led them to reread the question as well as they did not recognised their disease in early stage or its their carelessness.

For example, the participant responded to question 5

"How many symptoms of your illness do you experience? Ok, this question is asking me about what I have at present. So, at present, I have pain while walking, fatigue, and swelling in my leg. But due to all this, I don't have any major problems... but I remember before for six months I had pain in my leg which I have ignored. This may be my symptom before six months. SO I think I can select 5 in this question."

Emotional representation: For question 6 (concern), question 8 (emotions) and question 7 (comprehensibility), no participants had difficulty in answering these questions. This may be

because the participants understand their condition and the progression of the disease, which might be explained to them in their medical appointments.

For example, one participant responded to question 6:

“How concerned are you about your illness? I will give eight numbers for this because day by day, I don’t want to be a burden for my family member, and doctors told me that if I don’t stop B.D.(Cigar smoking), my disease will not get good cure. I might have to cut the leg in near future. So it’s 8 number for me.”

Most participants had no trouble answering question 9, which assessed the causal representation of the illness as they gained the information in their medical appointment. For example

“Please note the three most important factors responsible for your illness. You can use any of the above reasons. Yes, in important work, I think that this can happen due to stress in a person's life in the present situation. Secondly, I have a habit of smoking for many years, which is also one of the reasons explained to me by the doctor.”

Discussion

This is the first study to translate, culturally adapt, and validate the BIPQ in Gujarati to assess illness's cognitive and emotional representation in people with PAD. During the translation and cultural adaption of the BIPQ, there was nearly complete agreement between experts for all questions, and any discrepancies were resolved. When evaluating patient understanding and comprehension of the questionnaire, any problems encountered were straightforward, and all participants understood and responded appropriately to all the questions. Thus, the final version of the Gujarati BIPQ was developed (Annexure 2).

Our content validation findings are similar to studies that have previously translated B-IPQ questionnaire and achieved acceptable expert consensus following forward and backward translation.^(28,29)

Only two studies evaluated content validity of the translated B-IPQ. In Bahasa Indonesia version of B-IPQ with one in patients with type 2 diabetes mellitus finding a CVI value of 0.95 among four experts.⁽²⁸⁾ In another study, the BIPQ was translated into the Turkish language for periodontal disease. The translation was done with the help of 15 experts, and the content validity index (CVI) value was found to be 0.85.⁽²⁹⁾ In our study, we also found similar CVI values of 0.98 (Table 2) and there were excellent agreement experts(UA=0.87), which may be due to the fact that we had six experts in the content validation- as per the recommended guideline.⁽³¹⁾

Our think-aloud study findings identified participants completed that the Gujarati BIPQ had few problems. Only two participants re-read the questions exploring the constructs of identity and personal control. This might be because all the participants were recruited from one vascular center and were provided with disease information during their medical appointment, so had knowledge of the recommended treatments. This is in contrast to a study evaluating the Dutch language version of the BIPQ, where difficulties in answering questions related to identity, personal control, illness coherence, and causal attribution were experienced. Some participants were confused about the meaning of the phrase "having control over your illness", as this phrase is commonly associated with medical check-ups at hospitals in the Netherlands.⁽²¹⁾ However, we did not encounter any issues with these question constructs as we meticulously reviewed the translation and considered the wording of each question to avoid misinterpretation. Since our participants had no trouble understanding any of the questions and encountered only minor problems, the Gujarati BIPQ was considered to have good face validity.

This Gujarati BIPQ will be valuable for clinicians and researchers with IC who want to explore how people make sense of their PAD and how this influences their coping strategies and health behaviours to manage their condition. It is also suitable to explore illness perceptions across various health conditions because it is adaptable. For example, the words illness and treatment can be replaced with the name of another condition or particular treatment to make it relevant to different patient populations. It provides a useful and quick self-reported assessment of an individual perceptions.

Strengths and limitation

This study has several strengths and limitations. The Gujarati BIPQ underwent translation and psychometric testing using a standardized approach, ensuring clinical and non-clinical accuracy and reliability. Unfortunately, one of the limitations of our translation process is that we did not include the perspectives of PAD patients during the expert consensus meeting. To ensure the questionnaire's validity and patient comprehension, we tested it with a diverse PAD patient population of various ages, education levels, and sex. However, we only collected data 10 patients with IC from one vascular centre and this may not be generalisation to all in India.

Conclusion

Currently, the Gujarati BIPQ questionnaire is the only tool available in India that delves into the cognitive and emotional perception of illness for individuals with IC. It has an excellent level of agreement with the English BIPQ, good face validity and is easily comprehensible to most IC patients. Additionally, the questionnaire displays excellent content validity, making it a fitting instrument for assessing illness perception and developing interventions for people with IC.

Acknowledgment

We really appreciate the experts' and participants' significant knowledge and insights in translating the questionnaire.

References

1. Kim MS, Hwang J, Yon DK, Lee SW, Jung SY, Park S, et al. Global burden of peripheral artery disease and its risk factors, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Glob Health*. 2023 Oct;11(10):e1553–65.
2. Harwood AE, Totty JP, Broadbent E, Smith GE, Chetter IC. Quality of life in patients with intermittent claudication. *Gefasschirurgie*. 2017;22(3):159–64.
3. Abaraogu UO, Ezenwankwo EF, Dall PM, Seenan CA. Living a burdensome and demanding life: A qualitative systematic review of the patients experiences of peripheral arterial disease. Andras A, editor. *PLOS ONE*. 2018 Nov 15;13(11):e0207456.
4. Khanna NN, Krishna V, Manjunath CN, Tyagi S, Jindal R, Chadha M, et al. The Indian Consensus Statement for the Management of Lower Extremity Peripheral Artery Disease. *J Indian Coll Cardiol*. 2023 Aug;13(Special Suppl 1):S1–20.
5. Holmes MNG, Weinman JA, Bearne LM. as treatment for intermittent claudication. *J Health Psychol*.
6. Criqui MH, Matsushita K, Aboyans V, Hess CN, Hicks CW, Kwan TW, et al. Lower Extremity Peripheral Artery Disease: Contemporary Epidemiology, Management Gaps, and Future Directions: A Scientific Statement From the American Heart Association. *Circulation*. 2021 Aug 31;144(9):e171–91.
7. Harwood AE, Smith GE, Cayton T, Broadbent E, Chetter IC. A Systematic Review of the Uptake and Adherence Rates to Supervised Exercise Programs in Patients with Intermittent Claudication. *Ann Vasc Surg*. 2016 Jul;34:280–9.

8. Cetlin MD, Polonsky T, Ho K, Zhang D, Tian L, Zhao L, et al. Barriers to participation in supervised exercise therapy reported by people with peripheral artery disease. *J Vasc Surg.* 2023 Feb 1;77(2):506–14.
9. Galea Holmes MN, Weinman JA, Bearne LM. Are Walking Treatment Beliefs and Illness Perceptions Associated With Walking Intention and 6-Min Walk Distance in People With Intermittent Claudication? A Cross-Sectional Study. *J Aging Phys Act.* 2019 Aug 1;27(4):473–81.
10. Galea Holmes MN, Weinman JA, Bearne LM. “You can’t walk with cramp!” A qualitative exploration of individuals’ beliefs and experiences of walking as treatment for intermittent claudication. *J Health Psychol.* 2017 Feb;22(2):255–65.
11. Mosleh SM, Almalik MM. Illness perception and adherence to healthy behaviour in Jordanian coronary heart disease patients. *Eur J Cardiovasc Nurs.* 2016 Jun;15(4):223–30.
12. Thagizadeh A, Ghahramanian A, Zamanzadeh V, Aslanabadi N, Onyeka TC, Ramazanzadeh N. Illness perception and cardiovascular risk factors in patients with myocardial infarction undergoing percutaneous coronary intervention in Iran. *BMC Cardiovasc Disord.* 2022 Jun 2;22(1):245.
13. Bearne L, Galea Holmes M, Bieles J, Eddy S, Fisher G, Modarai B, et al. Motivating Structured walking Activity in people with Intermittent Claudication (MOSAIC): protocol for a randomised controlled trial of a physiotherapist-led, behavioural change intervention versus usual care in adults with intermittent claudication. *BMJ Open.* 2019 Aug 24;9(8):e030002.

14. Leventhal H, Phillips LA, Burns E. The Common-Sense Model of Self-Regulation (CSM): a dynamic framework for understanding illness self-management. *J Behav Med.* 2016 Dec;39(6):935–46.
15. APA PsycNet Home Page [Internet]. [cited 2023 Sep 16]. Available from: <https://psycnet.apa.org/home>
16. Broadbent E, Petrie KJ, Main J, Weinman J. The brief illness perception questionnaire. *J Psychosom Res.* 2006 Jun;60(6):631–7.
17. Broadbent E, Wilkes C, Koschwanez H, Weinman J, Norton S, Petrie KJ. A systematic review and meta-analysis of the Brief Illness Perception Questionnaire. *Psychol Health.* 2015 Nov 2;30(11):1361–85.
18. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: Report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health.* 2005 Mar;8(2):94–104.
19. Sekhon M, Cartwright M, Francis JJ. Development of a theory-informed questionnaire to assess the acceptability of healthcare interventions. *BMC Health Serv Res.* 2022 Mar 1;22(1):279.
20. Costello AB, Osborne J. Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. [cited 2023 Sep 16]; Available from: <https://scholarworks.umass.edu/pare/vol10/iss1/7/>
21. van Oort L, Schröder C, French DP. What do people think about when they answer the Brief Illness Perception Questionnaire? A “think-aloud” study. *Br J Health Psychol.* 2011 May;16(Pt 2):231–45.

22. Criqui MH, Denenberg JO, Bird CE, Fronek A, Klauber MR, Langer RD. The correlation between symptoms and non-invasive test results in patients referred for peripheral arterial disease testing. *Vasc Med Lond Engl*. 1996;1(1):65–71.
23. *Analysing qualitative data in psychology*. Thousand Oaks, CA: Sage Publications Ltd; 2007. xix, 275 p. (Lyons E, Coyle A, editors. *Analysing qualitative data in psychology*).
24. French DP, Cooke R, Mclean N, Williams M, Sutton S. What Do People Think about When They Answer Theory of Planned Behaviour Questionnaires?: A 'Think Aloud' Study. *J Health Psychol*. 2007 Jul 1;12(4):672–87.
25. Cohen J. Weighted kappa: nominal scale agreement with provision for scaled disagreement or partial credit. *Psychol Bull*. 1968 Oct;70(4):213–20.
26. Stemler SE. A Comparison of Consensus, Consistency, and Measurement Approaches to Estimating Interrater Reliability. [cited 2023 Sep 16]; Available from: <https://scholarworks.umass.edu/pare/vol9/iss1/4/>
27. Francis JJ, Johnston M, Robertson C, Glidewell L, Entwistle V, Eccles MP, et al. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychol Health*. 2010 Dec;25(10):1229–45.
28. Rias YA, Abiddin AH, Huda N, Handayani S, Sirait HS, Pien LC, et al. Psychometric Testing of the Bahasa Version of the Brief Illness Perception Questionnaire among Indonesians with Type 2 Diabetes Mellitus. *Int J Environ Res Public Health*. 2021 Sep 12;18(18):9601.
29. Önder C, Bakirarar B. Evaluating the Turkish validity and reliability of the Brief Illness Perception Questionnaire in periodontal diseases. *PeerJ*. 2023 Sep 11;11:e16065.

30. Meade L b., Bearne L m., Godfrey E l. Comprehension and face validity of the Exercise Adherence Rating Scale in patients with persistent musculoskeletal pain. *Musculoskeletal Care*. 2018;16(3):409–12.
31. Nasa P, Jain R, Juneja D. Delphi methodology in healthcare research: How to decide its appropriateness. *World J Methodol*. 2021 Jul 20;11(4):116–29.

Annexure I

Instruction for the think-aloud protocol

We are about to start a study. I have provided you with a questionnaire that has been translated into Gujarati. Your task is to read the questionnaire out loud and express your thoughts about it as you read the questions. This is called 'thinking aloud'. Please act as if you're alone at home, and you're talking to yourself. Simply tell me everything that comes to your mind as you read the questions and how you would go about answering them.

If you are silent for more than 5 secs, I will ask you to talk about your thoughts. Please try to speak loudly and clearly, and I will record as you speak. Do you understand what I want I am asking you to do this “think-aloud”? Do you agree to start?

The Brief Illness Perception Questionnaire

For the following questions, please circle the number that best corresponds to your views:

<p>How much does your illness affect your life?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p> <p>no affect at all severely affects my life</p>
<p>How long do you think your illness will continue?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p> <p>a very short time forever</p>
<p>How much control do you feel you have over your illness?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p> <p>absolutely no control extreme amount of control</p>
<p>How much do you think your treatment can help your illness?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p> <p>not at all extremely helpful</p>
<p>How much do you experience symptoms from your illness?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p> <p>no symptoms at all many severe symptoms</p>
<p>How concerned are you about your illness?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p> <p>not at all concerned extremely concerned</p>
<p>How well do you feel you understand your illness?</p> <p style="text-align: center;">0 1 2 3 4 5 6 7 8 9 10</p>

Annexure II

સંક્ષિપ્ત માંદગી ધારણા પ્રશ્નાવલી
નીચેના પ્રશ્નો માટે તમારા મંતવ્યો અનુસાર બંધબેસતા અંક પર વર્તુળ કરો

1. તમારી બીમારી તમારા જીવન ને કેટલી હદે અસર કરે છે?	0 બિલકુલ અસર કરતી નથી	1	2	3	4	5	6	7	8	9	10 ખુબ જ અસર કરે છે
2. તમારી બીમારી કેટલો સમય લાંબી ચાલશે એમ તમને લાગે છે?	0 ખુબ જ ટૂંકા સમય માટે	1	2	3	4	5	6	7	8	9	10 હંમેશા માટે
3. તમારી બીમારી ઉપર તમારો કેટલો નિયંત્રણ છે એમ તમને લાગે છે?	0 કોઈ જ નિયંત્રણ નથી	1	2	3	4	5	6	7	8	9	10 પુરે પૂરો નિયંત્રણ છે
4. તમારી સારવાર તમારી બીમારી ને મટાડવામાં કેટલી મદદરૂપ થશે એમ તમને લાગે છે?	0 બિલકુલ નહિ	1	2	3	4	5	6	7	8	9	10 ખુબ જ મદદરૂપ
5. તમારી બીમારીના કેટલા લક્ષણોનો તમે અનુભવ કરો છો?	0 બિલકુલ લક્ષણો નહિ	1	2	3	4	5	6	7	8	9	10 ગંભીર લક્ષણો
6. તમે તમારી બીમારી અંગે કેટલા ચિંતિત છો?	0 બિલકુલ ચિંતિત નથી	1	2	3	4	5	6	7	8	9	10 ખુબ જ ચિંતિત
7. તમે તમારી બીમારી ને કેટલી સારી રીતે સમજો છો?	0 બિલકુલ નહિ	1	2	3	4	5	6	7	8	9	10 ખુબ જ સારી રીતે
8. તમારી બીમારી તમારી લાગણીઓને કેટલી હદે અસર કરે છે? (દાખલા તરીકે, તમને ગુસ્સો અપાવે છે, તમને ડરાવે છે, તમને ઉદાસ કરે છે, તમને હતાશ કરે છે)	0 લાગણીઓને અસર કરતી નથી	1	2	3	4	5	6	7	8	9	10 લાગણીઓ ને અસર કરે છે

મહેરબાની કરીને તમારી બીમારી માટે જવાબદાર હોય એવા ત્રણ સૌથી મહત્વના પરિબલો નોંધો. તમે ઉપરોક્ત કારણો માંથી કોઈ પણ કારણોનો ઉપયોગ કરી શકો છો.

મારા માટે સૌથી અગત્ય ના કારણો

- ૧.
- ૨.
- ૩.

