

# Translation and cultural adaptation of the Illness Perception Questionnaire-Revised for Dental to Brazil

Marjorie Izabella Batista AGUIAR<sup>(a)</sup> 

Bruna Letícia BASSO<sup>(b)</sup> 

Marília Leão GOETTEMS<sup>(c)</sup> 

Marina Sousa AZEVEDO<sup>(c)</sup> 

Vanessa Polina Pereira da COSTA<sup>(c)</sup> 

Renata Andréa Salvitti de Sá ROCHA<sup>(d)</sup> 

Maria Beatriz Duarte GAVIÃO<sup>(b)</sup> 

Taís de Souza BARBOSA<sup>(a)</sup> 

<sup>(a)</sup>Universidade Federal de Juiz de Fora – UFJF, Faculty of Dentistry, Postgraduate Program in Dentistry, Juiz de Fora, MG, Brazil.

<sup>(b)</sup>Universidade Estadual de Campinas – Unicamp, Piracicaba Dental School, Department of Health Sciences and Pediatric Dentistry, Piracicaba, SP, Brazil.

<sup>(c)</sup>Universidade Federal de Pelotas – UFPel, Department of Social and Preventive Pelotas, RS, Brazil.

<sup>(d)</sup>Universidade Federal de Campina Grande – UFCG, Faculty of Dentistry, Health and Rural Technology Center, Patos, PB, Brazil.

<sup>(e)</sup>Universidade Federal de Juiz de Fora – UFJF, Department of Dentistry, Governador Valadares, MG, Brazil.

**Declaration of Interests:** The authors certify that they have no commercial or associative interest that represents a conflict of interest in connection with the manuscript.

## Corresponding Author:

Taís de Souza Barbosa  
E-mail: tais.barbosa@ufjf.edu.br

<https://doi.org/10.1590/1807-3107bor-2023.vol37.0004>

**Abstract:** This study aimed to translate and to perform the cultural adaptation of the instrument Illness Perception Questionnaire-Revised for Dental (IPQ-RD) into Brazilian Portuguese. The IPQ-RD consists of 34 items that assess the cognitive and emotional representation/perception of parents/caregivers of children with dental caries, with response options on a 5-point Likert scale, ranging from “Strongly agree” (score 1) to “Strongly disagree” (score 5). The higher the score, the lower the perception of the disease. The protocol consists of translation into Brazilian Portuguese, back-translation into English, revision by an Expert Review Committee, and pre-test (application in parents/caregivers of children in dental care). For some questions, the translated versions were identical (T1 = T2); for others, one version was preferred (T1 or T2); for still others, it was decided to modify terms to obtain greater clarity on the item (T3). In the first pre-test, three questions were misunderstood by more than 15% of the sample, after which the items were reviewed by the Expert Review Committee. In the second pre-test, the adapted version was applied to a new sample of parents/caregivers (n = 15) and the questions were understood by more than 85% of the participants. The Brazilian Portuguese version of the IPQ-RD was well understood by the evaluated population.

**Keywords:** Dental Caries; Parents; Child, Preschool; Surveys and Questionnaires; Translations.

## Introduction

Dental caries is one of the most frequent chronic diseases in childhood and the fourth most costly condition for treatment worldwide.<sup>1</sup> In Brazil, the prevalence of the disease varies from 20.3% to 53.6%, resulting in a negative impact on the quality of life of both children and families and being considered a public health problem.<sup>2,3</sup> However, most parents/guardians, especially those from a low socioeconomic level, perceive the disease only in severe stages, seeking dental treatment only when there is pain or visible loss of tooth structure.<sup>4</sup> In this population, lack of access to dental services, low socioeconomic level, and insufficient knowledge about child oral health and the effectiveness of preventive strategies

Submitted: September 18, 2021  
Accepted for publication: July 4, 2022  
Last revision: Aug 2, 2022



for caries act as barriers to promoting healthy oral hygiene practices for their children and to seeking dental care.<sup>5,6</sup>

To reduce the incidence of oral diseases, such as dental caries in childhood, it is necessary to develop public health programs with educational/preventive strategies.<sup>7,8</sup> However, the success of these programs will depend on health behaviors, which are determined by social and economic circumstances and parents/guardians awareness regarding their children's oral health status. Guardian perceptions are particularly important in preschool years due to the difficulty of children to verbalize their emotions at this stage.<sup>9</sup> Thus, some of the available measures to assess the perception of oral health of children appraise the guardians' knowledge, attitudes, or opinions about dental caries and the quality of life related to oral health reported by parents, which are mainly based on the social context, theories of cognitive behavior, and health.<sup>4</sup>

The instrument "Illness Perception Questionnaire-Revised for Dental" (IPQ-RD) is a recently adapted version for Dentistry of the instrument "Illness Perception Questionnaire", originally developed in English to assess five cognitive domains (identity, causes, consequences, control, and timeline) of the disease.<sup>10</sup> The revised version of the instrument ("Revised Illness Perception Questionnaire") improved the theoretical foundations of the original version by including two domains – disease coherence and emotional representations.<sup>11</sup> In 2016, this version was adapted for Dentistry as a complete and dynamic measure to understand how parents/guardians formulate cognitive and emotional representations/perceptions of their child's oral disease in reaction to their child's risk of disease and what aspects determine their coping strategies.<sup>4</sup>

The Common-Sense Model of Self-Regulation, a useful but still underutilized approach in dentistry, advocates that the personal beliefs of the patient or caregiver about a specific disease, treatment, and emotional response, influence disease outcomes, mainly through coping responses.<sup>11,12</sup> It is important that parents/guardians, as the child's primary oral health caregivers, present the correct representation of the disease, which ranges from the disorganized

model (acute phase – presence of the disease only when there are symptoms, such as pain) to the organized model (chronic phase – presence of the disease even in the absence of symptoms), for effective adherence to disease self-regulation strategies.<sup>13</sup>

Therefore, it is important to assess the cognitive and emotional perception of parents/guardians about aspects of caries disease in childhood. To accomplish this, the aim of the present study was to translate and perform the cultural adaptation of the original (English) version of the IPQ-RD into Brazilian Portuguese.

## Methodology

The Research Ethics Committee of the Federal University of Juiz de Fora approved the research protocol under protocol number CAAE 16525219.0.0000.5147. Parents/guardians of children receiving care at Pediatric Dental Clinic of the Federal University of Juiz de Fora, Governador Valadares Campus, Governador Valadares, MG, Brazil, were invited and those who agreed to participate signed an informed consent form after being informed about the aims of the study. This study was performed from July to December 2019.

Before starting the research, the authors of the original instrument were consulted and authorized its performance. The IPQ-RD was originally developed in English by Nelson et al.<sup>4</sup> to assess the representation/cognitive and emotional perception of parents/guardians about caries disease in children. The instrument consists of 33 multiple-choice items and one open-ended question (No. 34), divided into 8 cognitive dimensions and emotional representations, as shown in Figure. In the present study, the IPQ-RD was self-completed by parents/caregivers.

The response options for each multiple-choice item are on a 5-point Likert scale, ranging from "strongly agree" (score 1) to "strongly disagree" (score 5). The variation of scores for each domain is dependent on the number of items, and the total score is obtained by the sum of the domain scores; the higher the score, the lower the perception of the disease. Question 34 is evaluated by open-ended

	Domains	Definition	Nº of Items	Score Variation
1	Identity	perception of parents/guardians of the intensity of symptoms associated with dental caries in children	2	1-10
2	Consequences-child	beliefs about the deleterious consequences of tooth decay in the child's daily activities	7	1-35
3	Consequences-caregiver	beliefs about the harmful consequences of the child's tooth decay in their own daily activities (parents/guardians)	5	1-25
4	Control-child	beliefs about whether tooth decay and its symptoms can be prevented, ameliorated or kept under control by the child's actions	4	1-20
5	Control-caregiver	beliefs about whether the child's dental caries and its symptoms can be prevented, ameliorated or kept under control by their own actions (parents/guardians);	4	1-20
6	Timeline-chronic	beliefs about the chronicity and duration of dental caries in children;	2	1-10
	Timeline-cyclical	beliefs about the predictability and symptoms of dental caries in children;	2	1-10
7	Illness coherence	whether parents/guardians have a clear understanding of tooth decay and symptoms in the child;	2	1-10
8	Emotional representations	evaluation of the emotional response of parents/guardians to the presence of dental caries in the child	4	1-20
	Causes of child's cavities	perception of the causes of dental caries in children	1 (11 subitems)	1-55
	Causes of child's cavities (open question)	three most important causes of the disease	1	-

**Figure.** Synopsis of domains, definition, and number of items in the IPQ-RD.

answers, which are grouped into master ideas with similar meanings.

With the aim of translating the IPQ-RD into Brazilian Portuguese and adapting it to the Brazilian culture, a methodology proposed in specific literature with internationally recommended guidelines was followed.<sup>14,15</sup>

### Initial translation

The original version of the IPQ-RD was initially translated into Brazilian Portuguese by two English teachers who were native speakers of Brazilian Portuguese, independently and unaware of the purpose of this work, prioritizing the conceptual translation rather than the literal translation (translated versions - T1 and T2).

### Back-translation

The researchers, Pediatric Dentistry professors, combined the two Brazilian Portuguese versions (T1 and T2), originating the first translated version. This was back-translated into English independently by two native English teachers, who did not participate

in the first stage of translation and did not have access to the original instrument, thus obtaining the versions in English (back-translated versions - BT1 and BT2). The purpose of back-translation is to compare the English back-translation with the original instrument.

### Expert review committee

An expert committee, composed of five university professors who are Pediatric Dentistry specialists (M.L.G., M.S.A., V.P.P.C, R.A.S.S.R., T.S.B), one who is also an English teacher (R.A.S.S.R.) and one with experience in processes of translation and validation of health instruments (T.S.B), evaluated the translated and back-translated versions, as well as the original instrument. This step consisted of the following aspects:<sup>16</sup>

- a. Semantic equivalence: refers to the meaning of words;
- b. Idiomatic equivalence: formulation of colloquial expressions equivalent to the original language;
- c. Cultural equivalence of each issue: experiences lived within the society cultural context.

## Cultural adaptation (pre-test)

The cultural adaptation of the first translated version of the IPQ-RD (V1) was verified in a population of 15 parents/guardians of children undergoing dental care at the Interdisciplinary Pediatric Dental Clinic at the Federal University of Juiz de Fora, Governador Valadares Campus, representing 10% of the sample required for a validation and reliability study for this instrument. The option “I didn’t understand” was added to the Brazilian Portuguese version (V1) as one of the answers to all questions, in order to identify the questions that were not properly understood. The questions with a percentage of misunderstanding above 15% were submitted to the review of the expert review committee, which made the necessary cultural adaptations, resulting in a new revised version (V2). The V2 version was applied to a new group of 15 parents/guardians, who did not participate in the first pre-test [17]. The IPQ-RD was to be considered culturally adapted when all questions were understood by at least 85% of the participants, resulting in the final version (FV) that was socioculturally adapted.

## Results

### Translation, back-translation and expert review

Table 1 summarizes the modifications suggested by the expert review committee after evaluating the original version, the translated versions (T1 and T2), the back-translations (BT1 and BT2), and the version suggested for cultural adaptation.

Questions 4, 5, 6, 7, 8, and 14 were modified from the term “committed” to the term “affected” for a better understanding by parents/guardians. In question eight (8), the terms “your school activities” were replaced by “my child’s school activities” to avoid ambiguity in interpretation. In questions 11, 17, 20, and 28, the pronoun “in” was replaced by the pronoun “of (*da*)” so that the greater sense of ownership is clear, as well as in question 18, in which it was decided to add the terms “his/her”.

In items 15, 16, 17 and 23, the term “improvement of dental caries” was preferred to “control of dental caries”, since the first option more literally reflects the intent to improve children’s tooth decay. The change of

terms in questions 31 and 32 (“makes me” for “makes me feel”) was due to the choice for a more colloquial language rather than a more sophisticated language.

In questions 18, 21, and 22, the terms “many things” was added to the sentence “there is a lot I can do” so that the phrase reflects a concrete action that can be performed. In some items, some terms were replaced to make understanding clearer, such as: “I clearly understand” instead of “I have a good understanding” (question 27) and “long durability” for “long duration” (question 24), and in questions 25 and 33, in which “in my male/female child” replaced the term “in my child”.

In question 29, we preferred to add the term “suffering from tooth decay” to emphasize the fact that tooth decay negatively affects children.

Thus, the first translated version was obtained (V1).

### First pre-test

Table 2 shows the synopsis of the first pre-test performed with 15 parents/guardians (12 women). In the application of V1, 17 questions were misunderstood by at least one participant (n = 8, 6 women), and the level of misunderstanding was higher than 15% for items 9 (26.67%), 17, and 18 (20%). Questions 1, 11, 20, 23, 27, 29, 30, 31, 32, 33e were not understood by 6.67% of the sample, while items 24, 25, 26, and 33g had a 13.33% misunderstanding rate.

### Expert review committee (second step)

To adapt the terms that were misunderstood by more than 15% of the study population, the items in question were resubmitted to the expert review committee (with the same members as the previous one) for evaluation. Questions 9, 17, and 18 were reworded to make the terms clearer to parents/guardians.

In question 9, the expression “The dental caries in my male/female child is disabling” was replaced by the expression “The dental caries in my male/female child makes him/her unable to perform daily activities”. In question 17, the phrase “The improvement of my male/female child tooth decay does not depend on chance or fate” was replaced by “The improvement of my male/female child tooth decay does not occur on itself”. In question 18, the sentence “What my

**Table 1.** Assessments suggested by the expert review committee. Only modified items are shown.

Original version		Translation		Back translation		Suggested version	Committee
Item	Sentence	T1	T2	R1	R2		
4	had a big effect	têm afetado	tem um grande efeito	had a big effect	is a serious disease	Tem comprometido	tem afetado
5	had a big effect	têm afetado	tem um grande efeito	had a big effect	has influenced a lot	Tem comprometido	tem afetado
6	had a big effect	têm afetado	tem um grande efeito	had a big effect	has influenced a lot	Tem comprometido	tem afetado
7	had a big effect	têm afetado	tem um grande efeito	had a big effect	has influenced a lot	Tem comprometido	tem afetado
	his/her school work	suas atividades escolares	em seu trabalho escolar	his/her school work	My child's scholastic performance	o desempenho escolar do meu/minha filho (a)	as atividades escolares do meu (minha)filho (a)
8	had a big effect	têm afetado	tem um grande efeito	had a big effect	has influenced a lot	Tem comprometido	tem afetado
11	I cannot easily live	É difícil conviver	Eu não posso viver facilmente"	I cannot easily live	I don't handle well	Eu não lido bem	É difícil conviver
	my child's cavities	com as cáries de meu filho	Com as cáries do(a) meu (minha) filho(a)	my child's cavities	with the dental caries in my child	com a cárie dentária em meu (minha) filho(a)	com a cárie dentária do(a) meu (minha) filho(a)
12	has a big effect on how	têm afetado muito como os outros	tem um grande efeito em como os outros	had a big effect on how others	has a big impact in the way others help make his/her cavities better	tem grande impacto na forma que os outros	tem afetado muito o modo como
14	has a big effect	afetam muito	tem um grande efeito	have caused	has impacted	tem comprometido	tem afetado
15	improve the cavities	eliminar as cáries	melhorar as cáries	control the cavities	control dental caries	controlar a cárie dentária	melhorar a cárie dentária
16	help make his/her cavities better	ajudará com que ele	ajudará a melhorar suas cáries	help control my child's cavities	help my children controlling the dental caries	ajudará meu(minha) filho (a) a controlar a cárie dentária	ajudará meu(minha) filho (a) a melhorar a cárie dentária
17	Improve in my child cavities	Eliminar as cáries do meu filho	A melhora nas cáries do meu filho"	The control of my child	The control of dental cavities	O controle da cárie dentária em meu filho	A melhora da cárie dentária do meu filho
18	What my child does decides if his/her cavities get better or worse.	O que meu filho faz é decisivo para a melhora ou piora da cárie	O que meu filho (a) faz decide se as suas cáries melhoram ou pioram	My child's choice decides if his/her cavities get better or worse	The choices of my child are decisive for the improvement or worsening of the dental caries	As escolhas do meu filho (minha) filho (a) são decisivas para a melhora ou piora da cárie dentária.	O que meu filho faz determina a melhora ou piora da cárie dentária dele (dela).
19	There is a lot I can do	Há muito que eu possa fazer	Há muitas coisas que eu posso fazer	There is a lot I can do	There is a lot I can do	Há muito que eu possa fazer	Há muitas coisas que eu posso fazer
20	What I do decides if my child's cavities get better or worse.	O que faço decide se as cáries de meu filho melhoram ou pioram.	O que eu faço decide se as cáries do(a) meu(minha) filho(a) melhoram ou pioram.	My choices decide if my child's cavities get better or worse.	My choices are decisive for the improvement or worsening of the dental caries in my child.	As minhas escolhas são decisivas para a melhora ou piora da cárie dentária em meu (minha) filho (a).	O que eu faço determina a piora ou piora da cárie dentária do meu (minha) filho (a).
21	There is a lot I can do	Há muito que eu possa fazer	Há muitas coisas que eu posso fazer	There is a lot I can do	There is a lot I can do	Há muito que eu possa fazer	Há muitas coisas que eu possa fazer

Continue

Continuation							
22	There is a lot I can do	Há muito que eu possa fazer	Há muitas coisas que eu posso fazer	There is a lot I can do	There is a lot I can do	Há muito que eu possa fazer	Há muitas coisas que eu posso fazer
23	My child's cavities will not get better over time.	As cáries de meu filho não melhoram com o tempo.	As cáries do(a) meu(minha) filho(a) não melhorarão ao longo do tempo.	My child's cavities will not be controlled over time.	The dental caries in my child will not be controlled over time.	A cárie dentária em meu (minha) filho (a) não será controlada ao longo do tempo.	A cárie dentária do meu f(minha) filho (a) não irá melhorar ao longo do tempo
24	to be long-lasting rather than short-term.	serem mais de longo prazo do que de curto prazo	de serem mais duradouras ao invés de de curto prazo	to be long-lasting rather than short-term.	will have long durability instead of short durability	terá longa durabilidade ao invés de curta durabilidade	Terá longa duração ao invés de curta.
25	Cavities in my child may change from time to time.	Cáries em minha criança pode variar de tempos em tempos	As cáries no meu filho podem mudar de tempos em tempos.	Cavities in my children can vary by time to time	Cavities in my child can change regularly	Cáries em minha criança pode variar de tempos em tempos	A cárie dentária em meu (minha) filho (a) pode mudar de tempos em tempos.
27	I have a clear understanding	Compreendo claramente	Tenho compreensão clara"	I have a clear understanding	I have a good understanding	Eu tenho boa compreensão	Eu entendo claramente
28	My child's	de meu filho	do(a) meu (minha) filho (a)	My child's	in my children	em meu filho	do meu (minha) filho(a)
29	I get really sad and upset when I think about my child suffering from cavities.	Fico triste e preocupado ao pensar no sofrimento de meu filho com as cáries.	Fico muito aborrecido(a) e triste quando penso em meu(minha) filho(a) sofrendo de cáries.	I get really sad and upset when I think about my child's cavities.	I am very sad and upset when I think about the dental caries in my child.	Eu fico muito triste e chateado (a) quando eu penso sobre a cárie dentária em meu (minha) filho (a).	Eu fico muito triste e chateado (a) quando eu penso no meu filho sofrendo de cárie dentária
31	makes me feel angry	faz com que eu me zangue	faz com que eu tenha raiva	make me feel angry	makes me feel angry	faz me sentir zangado	faz com que eu me sinta zangado
32	makes me feel helpless	faz com que me sinta impotente	pode fazer com que eu me sinta impotente	make me feel helpless	makes me feel powerless	pode me fazer sentir impotente	faz com que eu me sinta impotente

male/female child does determines the improvement or worsening of his/her tooth decay" was rewritten as "The attitudes of my male/female child determine the improvement or worsening of his/her tooth decay".

### Second pre-test

Table 3 shows the synopsis of the second pre-test performed in a new sample of 15 parents/guardians (12 women). In the application of V2, 17 questions were answered "I didn't understand" by at least one participant (n = 7, 4 women), but no item exceeded the 15% limit of misunderstanding. Questions 4, 8, 10, 12, 14, 15, 16, 18, 19, 22, 24, 31, and 32 were misunderstood by 6.67% of the sample, while items 1, 20, 21, and 28 had a misunderstanding percentage of 13.33%. Thus, the Brazilian Portuguese FV of the IPQ-RD was considered socioculturally adapted.

The open-ended question (#34) was well understood by all participants in both stages of the pre-test. The causes reported as the most important for the development of dental caries in children were: "lack of/wrong/poor tooth brushing" (38.5%), "poor diet/eating sweets" (30.8%), "tiredness/ despondency / emotional" (7.7%), "daily rush" (7.7%), "not flossing" (7.7%), "being in another environment" (2.6%), "worm or virus" (2.6%), and "not going to the dentist" (2.6%).

### Discussion

The IPQ-RD is a measurement instrument used to understand the perception of parents/guardians regarding dental caries in children. The evaluations obtained by this tool can be used to develop effective strategies for the prevention and treatment of

**Table 2.** Synopsis of the first pre-test: specification of misunderstood questions regarding sex and age of parents/guardians (n=15). Only items not understood are shown.

Question	Subject								No. (%) of Misunderstanding
	1	2	3	7	10	11	14	15	
	Sex ♂	♀	♀	♀	♀	♀	♀	♂	
	Age 37	-	41	22	34	45	25	36	
1	A cárie dentária é uma doença que, geralmente, apresenta sintomas de natureza intensa								X 1 (6.67)
9	A cárie dentária em meu (minha) filho (a) é incapacitante.								X X X 4 (26.67)
11	É difícil conviver com a cárie dentária do meu (minha) filho (a).								X 1 (6.67)
17	A melhora da cárie dentária do meu (minha) filho (a) não depende do acaso ou destino.								X X X 3 (20.0)
18	O que meu (minha) filho (a) faz determina a melhora ou piora da cárie dentária dele (dela).								X X X 3 (20.0)
20	O que eu faço determina a melhora ou piora da cárie dentária do meu (minha) filho (a).								X 1 (6.67)
23	A cárie dentária do meu (minha) filho (a) não irá melhorar ao longo do tempo.								X 1 (6.67)
24	A cárie dentária em meu (minha) filho (a) provavelmente terá longa duração ao invés de curta duração.								X X 2 (13.33)
25	A cárie dentária em meu (minha) filho (a) pode mudar de tempos em tempos.								X X 2 (13.33)
26	Haverá momentos em que os sintomas da cárie dentária do meu (minha) filho (a) irão piorar e outros momentos em que irão melhorar.								X X 2 (13.33)
27	Eu entendo claramente a cárie dentária do meu (minha) filho (a).								X 1 (6.67)
29	Eu fico muito triste e chateado (a) quando eu penso no meu (minha) filho (a) sofrendo de cárie dentária.								X 1 (6.67)
30	Ver meu (minha) filho (a) com cárie dentária me preocupa.								X 1 (6.67)
31	Ver meu (minha) filho (a) com cárie dentária faz com que eu me sinta zangado.								X 1 (6.67)
32	Ver meu (minha) filho (a) com cárie dentária pode fazer com que eu me sinta impotente								X 1 (6.67)
33e	O acaso ou falta de sorte causou a cárie dentária em meu (minha) filho (a).								X 1 (6.67)
33g	Algo que eu fiz como pai/mãe causou a cárie dentária em meu (minha) filho (a)								X X 2 (13.33)

dental caries in children. In addition, there is the possibility of restructuring the conceptions of parents/guardians about the disease, considering that the literature reports that the parents' cognitive and emotional representations are mostly based on cultural knowledge or past/current experiences.<sup>18</sup> The use of this instrument can improve knowledge about the disease, providing opportunities for improved disease management and, consequently, promote preventive behaviors and the seeking for dental treatment.<sup>4,19</sup>

The IPQ-RD showed valid and reliable results in studies carried out in other countries and for other chronic conditions, both in general health and oral health. However, to be used in other languages and cultures, the items need to be linguistically and culturally adapted according to the context in which it is to be used.<sup>20,21</sup> In this study, translation and cultural adaptation process was aimed at better understanding by the target population. According to Mota Falcão et al.,<sup>22</sup> the lack of cross-cultural equivalence of research instruments can compromise

**Table 3.** Synopsis of the second pre-test: specification of questions not understood in relation to the sex and age of the evaluated parents/guardians (n=15). Only items not understood are shown.

Question	Subject								Nº (%) of Misunderstanding
	1	3	4	6	8	12	13		
	Sex ♀	♀	♂	♂	♀	♀	♂		
	Age	59	23	-	39	31	-	-	
1	A cárie dentária é uma doença que, geralmente, apresenta sintomas de natureza intensa		X		X				2 (13.33)
4	A cárie dentária tem afetado muito a vida do meu (minha) filho (a).			X					1 (6.67)
8	A cárie dentária tem afetado muito a autoestima do meu (minha) filho (a).			X					1 (6.67)
10	A cárie dentária em meu (minha) filho (a) tem grande impacto na minha vida.							X	1 (6.67)
12	A cárie dentária em meu (minha) filho (a) tem afetado muito o modo como os outros me veem.			X					1 (6.67)
14	A cárie dentária em meu (minha) filho (a) tem afetado muito a minha autoestima.			X					1 (6.67)
15	Há muitas coisas que podem ser feitas para melhorar a cárie dentária em meu (minha) filho (a).			X					1 (6.67)
16	O tratamento ajudará meu (minha) filho (a) a melhorar a cárie dentária.			X					1 (6.67)
18	As atitudes do meu (minha) filho (a) determinam a melhora ou a piora da cárie dentária dele (dela).			X					1 (6.67)
19	Há muitas coisas que eu posso fazer para controlar os sintomas da cárie dentária do meu (minha) filho (a).			X					1 (6.67)
20	O que eu faço determina a melhora ou piora da cárie dentária do meu (minha) filho (a).	X						X	2 (13.33)
21	Há muitas coisas que eu possa fazer para paralisar a cárie dentária do meu (minha) filho (a) uma vez que se inicia.			X		X			2 (13.33)
22	Há muita coisa que eu posso fazer para prevenir a cárie dentária em meu (minha) filho (a).			X					1 (6.67)
24	A cárie dentária em meu (minha) filho (a) provavelmente terá longa duração ao invés de curta duração.			X					1 (6.67)
28	Os sintomas da cárie dentária do (a) meu (minha) filho (a) não são confusos para mim.			X				X	2 (13.33)
31	Ver meu (minha) filho (a) com cárie dentária faz com que eu me sinta zangado.			X					1 (6.67)
32	Ver meu (minha) filho (a) com cárie dentária pode fazer com que eu me sinta impotente.							X	1 (6.67)

the validity of the information collected, as it can be difficult for respondents to correctly understand the concept that is intended to be evaluated. Previous studies suggest that the process of adapting instruments to another culture should consider language, cultural, ethnic and socioeconomic differences, since the translation process and cross-cultural adaptation of a questionnaire developed in another language goes far beyond the idiomatic issue and semantics.<sup>23,24</sup> The translated instrument must be able to obtain the same

effect in the new culture to as the original instrument did in the context in which it was created.<sup>25,26</sup>

There are protocols to be followed that aim to minimize the loss of the instrument's original characteristics due to language change. In this study, we chose a protocol that advocates the process of translation and back-translation as a way to amplify and reveal errors and misinterpretations in the initial translations.<sup>14,15</sup> During these stages, emphasis has been placed on semantic equivalence rather

than literal equivalence between terms, since literal equivalence is not always more advantageous for expressing concepts or situations of the population to be studied.<sup>14,25-27</sup> This can be seen in the translation of the term “has a big effect”, which in the literal sense would be translated to “has a great effect”, but the term “has affected” was chosen, as it was considered more understandable by the parents / guardians under study.

The use of more than one version of translations and back-translations allows selecting the best items to incorporate or even combining items from different versions. This strategy makes it possible to analyze the sequence of procedures, including the translations themselves, the back-translations, and the subsequent assessments. The review by the expert committee is paramount to detecting problems in the earlier stages of the study and then redirecting decisions in the process that might otherwise have been unsatisfactory.<sup>28</sup> In this study, most of the changes suggested by the expert review committee were due to the replacement of terms that were more understandable for the studied sample, including: a) replacement of pronouns and terms that indicated ownership to avoid ambiguity in understanding the issue; b) choosing similar terms in Portuguese instead of literal translation, since some words when literally translated, could be difficult to understand in the sample; and c) choice of colloquial language instead of formal language, aiming to facilitate the understanding of the questionnaire by parents/guardians. In all modifications, care was taken to preserve the effect and context of the original instrument.<sup>26</sup>

The application of the translated and revised versions of the questionnaire in a small sample of the target population is necessary to identify possible difficulties in understanding and to confirm, at this stage, the semantic equivalence and the operational equivalence.<sup>29</sup> In this study, the number of subjects involved and the characterization of the sample in the pre-test stages were adequately described, in accordance with the methodological criteria recommended for cultural adaptation of questionnaires.<sup>30</sup> During the pre-test, some difficulties in the understanding of expressions were identified, such as “it depends on

chance or fate”, a term considered incomprehensible, as it encompasses an unspecific meaning. In addition, the terms “it is disabling” and “What my male/female child does” were also misunderstood, as they were considered of complex understanding and had to be replaced by simpler expressions that facilitated understanding, namely “makes you incapable for” and “The attitudes of my son (daughter)”, while maintaining fidelity to the purpose of the original version. The majority of the population (69.2%) was aware of the causal relationship between lack of toothbrushing and consumption of sugary foods with development of childhood caries. In addition, emotional reasons, daily routine, bacteriology, lack of flossing, and not seeking dental services were also reported as causes of the disease.

After the reformulations, a new pre-test was carried out with a new sample of parents/guardians, following the same methodological criteria implemented in the first pre-test. In the second pre-test, the percentage of “I didn’t understand” responses was less than 15%, so the translated version of the IPQ-RD was considered culturally adapted for the population being studied.<sup>17,30</sup> It is important to emphasize that the translation and cross-cultural adaptation of the instrument are initial steps that must be followed in subsequent large scale applications of the instrument and in studies of the psychometric properties, such as validity and reliability of the translated and adapted version.<sup>30</sup> For a full cultural adaptation, a study of measurement equivalence is also necessary, with an assessment of the reliability and validity of the new version in different populations and clinical conditions. Future studies will be conducted in order to meet these requirements.

Failure to use adequate methodology for the translation and cultural adaptation of research questionnaires can lead to bias and problems, such as using an improperly tested questionnaire that may differ from the original version. Therefore, researchers must report all stages of the process, detailing the results of the validity tests, so that other researchers can make informed decisions about the instrument that will best address their objectives. Considering the limitations of this study, the IPQ-RD should be tested in other regions of Brazil so that it can be considered

validated for Brazilian Portuguese. In addition, the instrument should be applied in clinical contexts, such as public or private pediatric dental clinics, where children have already experienced dental care, which would provide different perceptions of the construct in question. Finally, new studies with representative samples should be conducted to test the validity and reliability of the culturally adapted IPQ-RD.

## Conclusions

It can be concluded that the IPQ-RD instrument was properly translated into Brazilian Portuguese and adapted to the cultural context of the evaluated

population. Considering the cultural dimension of Brazil, new studies must be carried out in different regions to obtain a fully culturally adapted instrument.

## Acknowledgements

The authors thank the parents/guardians who participated in the survey as volunteers.

This study was supported by the Programa Institucional de Bolsas de Iniciação Científica do Conselho Nacional de Desenvolvimento Científico e Tecnológico (PIBIC/CNPq) da Universidade Estadual de Campinas (Unicamp) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes).

## References

1. Arora A, Scott JA, Bhole S, Do L, Schwarz E, Blinkhorn AS. Early childhood feeding practices and dental caries in preschool children: a multi-centre birth cohort study. *BMC Public Health*. 2011 Jan;11(1):28. <https://doi.org/10.1186/1471-2458-11-28>
2. Abanto J, Tsakos G, Paiva SM, Carvalho TS, Raggio DP, Bönecker M. Impact of dental caries and trauma on quality of life among 5- to 6-year-old children: perceptions of parents and children. *Community Dent Oral Epidemiol*. 2014 Oct;42(5):385-94. <https://doi.org/10.1111/cdoe.12099>
3. Corrêa-Faria P, Paixão-Gonçalves S, Paiva SM, Pordeus IA. Incidence of dental caries in primary dentition and risk factors: a longitudinal study. *Braz Oral Res*. 2016 May;30(1):S1806-83242016000100254. <https://doi.org/10.1590/1807-3107BOR-2016.vol30.0059>
4. Nelson S, Slusar MB, Albert JM, Liu Y, Riedy CA. Psychometric properties of a caregiver illness perception measure for caries in children under 6 years old. *J Psychosom Res*. 2016 Feb;81:46-53. <https://doi.org/10.1016/j.jpsychores.2016.01.002>
5. Slusar MB, Nelson S. Caregiver illness perception of their child's early childhood caries. *Pediatr Dent*. 2016 Oct;38(5):425-31.
6. Villalobos-Galvis FH, Mafla AC, Burbano-Trujillo WF, Sanchez-Figueroa AA. Psychometric properties of the revised illness perception questionnaire for oral health. *Caries Res*. 2017;51(3):244-54. <https://doi.org/10.1159/000468993>
7. Batista MJ, Lawrence HP, Sousa MD. Oral health literacy and oral health outcomes in an adult population in Brazil. *BMC Public Health*. 2017 Jul;18(1):60. <https://doi.org/10.1186/s12889-017-4443-0>
8. Sheiham A, Alexander D, Cohen L, Marinho V, Moyses S, Petersen PE, et al. Global oral health inequalities: task group: implementation and delivery of oral health strategies. *Adv Dent Res*. 2011 May;23(2):259-67. <https://doi.org/10.1177/0022034511402084>
9. Perazzo MF, Gomes MC, Neves ÉT, Martins CC, Paiva SM, Costa EM, et al. Oral problems and quality of life of preschool children: self-reports of children and perception of parents/caregivers. *Eur J Oral Sci*. 2017 Aug;125(4):272-9. <https://doi.org/10.1111/eos.12359>
10. Weinman J, Petrie KJ, Moss-Morris R, Horne R. The illness perception questionnaire: a new method for assessing the cognitive representation of illness. *Psychol Health*. 1996;11(3):431-45. <https://doi.org/10.1080/08870449608400270>
11. Moss-Morris R, Weinman J, Petrie KJ, Horne R, Cameron LD, Buick D. The Revised Illness Perception Questionnaire (IPQ-R). *Psychol Health*. 2002;17(1):1-16. <https://doi.org/10.1080/08870440290001494>
12. Leventhal H, Brissette I, Leventhal EA. The common-sense model of self-regulation of health and illness. In: Cameron LD, Leventhal H, editors. *The self-regulation of health and illness behavior*. London: Routledge; 2003. p. 42-65.
13. Edgar KA, Skinner TC. Illness representations and coping as predictors of emotional well-being in adolescents with type 1 diabetes. *J Pediatr Psychol*. 2003 Oct-Nov;28(7):485-93. <https://doi.org/10.1093/jpepsy/jsg039>
14. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol*. 1993 Dec;46(12):1417-32. [https://doi.org/10.1016/0895-4356\(93\)90142-N](https://doi.org/10.1016/0895-4356(93)90142-N)
15. Guillemin F. Cross-cultural adaptation and validation of health status measures. *Scand J Rheumatol*. 1995;24(2):61-3. <https://doi.org/10.3109/03009749509099285>
16. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000 Dec;25(24):3186-91. <https://doi.org/10.1097/00007632-200012150-00014>

17. Ciconelli RM, Ferraz MB, Santos W, Meinão IM, Quaresma MR. [Brazilian-Portuguese version of the SF-36: a reliable and valid quality of life outcome measure]. *Rev Bras Reumatol*. 1999;39(3):143-50. Portuguese.
18. Hagger M, Orbell S. A meta-analytic review of the common-sense model of illness representations. *Psychol Health*. 2003;18(2):141-84. <https://doi.org/10.1080/088704403100081321>
19. Feng X, Nie L, Ran W, Jin Y. [Reliability and validity of Chinese version of Illness Perception Questionnaire Revised for dental among caregivers of preschool children with caries.] *Chinese Nurs Manage*. 2019;19:1000-4. <https://doi.org/10.3969/j.issn.1672-1756.2019.07.010>
20. Abubakari AR, Jones MC, Lauder W, Kirk A, Devendra D, Anderson J. Psychometric properties of the Revised Illness Perception Questionnaire: factor structure and reliability among African-origin populations with type 2 diabetes. *Int J Nurs Stud*. 2012 Jun;49(6):672-81. <https://doi.org/10.1016/j.ijnurstu.2011.11.008>
21. Mafla AC, Herrera-López HM, Villalobos-Galvis FH. Psychometric approach of the revised illness perception questionnaire for oral health (IPQ-R-OH) in patients with periodontal disease. *J Periodontol*. 2019 Feb;90(2):177-88. <https://doi.org/10.1002/JPER.18-0136>
22. Falcão DM, Ciconelli RM, Ferraz MB. Translation and cultural adaptation of quality of life questionnaires: an evaluation of methodology. *J Rheumatol*. 2003 Feb;30(2):379-85.
23. Allen A, Walsh JA. A construct-based approach to equivalence: Methodologies for cross-cultural/multicultural personality assessment research. In: Dana RH, editor. *Handbook of cross-cultural and multicultural personality assessment*. Abingdon: Routledge; 2000. p. 81-104.
24. Corless IB, Nicholas PK, Nokes KM. Issues in cross-cultural quality-of-life research. *J Nurs Scholarsh*. 2001;33(1):15-20. <https://doi.org/10.1111/j.1547-5069.2001.00015.x>
25. Herdman M, Fox-Rushby J, Badia X. 'Equivalence' and the translation and adaptation of health-related quality of life questionnaires. *Qual Life Res*. 1997 Apr;6(3):237-47. <https://doi.org/10.1023/A:1026410721664>
26. Reichenheim ME, Moraes CL, Hasselmann MH. [Semantic equivalence of the Portuguese version of the Abuse Assessment Screen tool used for the screening of violence against pregnant women]. *Rev Saude Publica*. 2000 Dec;34(6):610-6. Portuguese. <https://doi.org/10.1590/S0034-89102000000600008>
27. Tesch FC, Oliveira BH, Leão A. [Semantic equivalence of the Brazilian version of the Early Childhood Oral Health Impact Scale]. *Cad Saude Publica*. 2008 Aug;24(8):1897-909. Portuguese. <https://doi.org/10.1590/S0102-311X2008000800018>
28. Barbosa TS, Gavião MB. [Quality of life and oral health in children - Part II: Brazilian version of the Child Perceptions Questionnaire]. *Cien Saude Colet*. 2011 Jul;16(7):3267-76. Portuguese. <https://doi.org/10.1590/S1413-81232011000800026>
29. Fortes CP, Araújo AP. Check list para tradução e Adaptação Transcultural de questionários em saúde. *Cad Saude Colet*. 2019;27(2):202-9. <https://doi.org/10.1590/1414-462x201900020002>
30. Castro RA, Portela MC, Leão AT. [Cross-cultural adaptation of quality of life indices for oral health]. *Cad Saude Publica*. 2007 Oct;23(10):2275-84. <https://doi.org/10.1590/S0102-311X2007001000003>