Original Article

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Translation and cross-cultural adaptation of the Bone-Anchored Hearing Aid Questionnaire into Brazilian Portuguese

Tradução e adaptação transcultural do Bone-Anchored Hearing Aid Questionnaire para o português do Brasil

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ABSTRACT

Purpose: To translate and cross-culturally adapt the Bone-Anchored Hearing Aid Questionnaire into Brazilian Portuguese. **Methods**: To develop the translation and cross-cultural adaptation process, the methodology widely used in the literature was followed, consisting of the following stages: translation; synthesis of the translations; back-translation; evaluation by the committee of experts; pre-testing and sending the reports to the developers. The expert committee was made up of a Methodologist, a Speech therapist/Audiologist, two Translators and two Back-translators and the researcher, who judged the semantic, idiomatic, experiential and conceptual equivalences. In the pre-test, 30 Bone Anchored Hearing Aid users were chosen to evaluate the content in terms of clarity of the language, suitability of the language for the age group and social level, understanding of the item, suitability of terms and need for modification, using a Likert scale. **Results**: The questionnaire was translated from English into Portuguese, producing a measuring instrument with adequate equivalence, as far as the expert committee was concerned. For users, the content validity is revealed to be satisfactory. **Conclusion**: The result of the study is a translated and cross-culturally adapted "Bone-Anchored Hearing Aid (Q-BAHA)" questionnaire ready for the next stage regarding the evaluation of psychometric measures.

Keywords: Bone-Anchored prosthesis; Bone conduction; Hearing aids; Surveys and questionnaires; Patient satisfaction

RESUMO

Objetivo: realizar a tradução e a adaptação transcultural do *Bone-Anchored Hearing Aid Questionnaire* para o português do Brasil. **Método**: para desenvolver o processo de tradução e adaptação transcultural, seguiu-se a metodologia amplamente utilizada na literatura, composta pelas seguintes etapas: tradução; síntese das traduções; retrotradução; avaliação pelo comitê de especialistas; pré-teste e envio dos relatórios aos desenvolvedores. O comitê de especialistas foi composto por um metodologista, uma fonoaudióloga/audiologista, dois tradutores, dois retrotradutores e a pesquisadora, que julgaram as equivalências semânticas, idiomáticas, experienciais e conceituais. No pré-teste, elegeram-se 30 usuários de próteses auditivas ancoradas no osso que avaliaram o conteúdo quanto à clareza da linguagem, à adequação da linguagem para a faixa etária e nível social, à compreensão do item, à adequação dos termos e necessidade de modificação, utilizando a escala Likert. **Resultados**: o questionário foi traduzido da língua inglesa para a língua portuguesa, sendo produzido um instrumento de medida com equivalências adequadas, no julgamento do comitê de especialistas. Para os usuários, a verificação da validade de conteúdo revelou ser satisfatória. **Conclusão**: o estudo resultou no questionário Prótese Auditiva Ancorada no Osso - Q-BAHA, traduzido e adaptado transculturalmente, podendo seguir para a etapa subsequente de avaliação de medidas psicométricas.

Palavras-chave: Prótese ancorada no osso; Condução óssea; Auxiliares de audição; Inquéritos e questionários; Satisfação

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INTRODUCTION

Bone-anchored hearing aids (BAHAs) were first implemented worldwide in the 1970s and have become the standard in hearing health care for the rehabilitation of individuals with conductive and mixed hearing loss, as well as unilateral hearing loss[1].

BAHAs consist of an external (sound processor) and an internal component (implantable) and are classified as percutaneous and transcutaneous. In both, the sound is transmitted as a mechanical signal by skull vibration, directly to the cochlea, eliminating the need for adapters such as earmolds, ear tips, or any other sound conductor in the external auditory canal[2]. The percutaneous hearing aids are coupled to the external unit by a titanium pin implanted in bone, while transcutaneous devices are coupled to the external unit by a magnet[3]. This prosthesis presents the advantage of keeping the skin intact, thus minimizing the postoperative problems observed with percutaneous implants, such as skin infections and implant loss[4]. However, the attenuation caused by the skin can cause limited gain at high frequencies when compared to percutaneous BAHAs[5].

Improved audibility at high frequencies has been shown with the percutaneous compared to the transcutaneous system[6]. However, this result did not influence the recognition of sentences in any system.

Thus, considering the importance of subjective assessment by users of BAHAs and to present a synthesis of instruments used to assess this population, a theoretical compilation based on a scoping review has been performed[7]. The triggering question for the scoping review on the topic of interest was: "Which questionnaires and scales are used to assess the satisfaction of bone-anchored hearing aid users?"

The survey found significant variability of instruments, especially questionnaires such as the *Glasgow Benefit Inventory* (GBI)[8], *Abbreviated Profile of Hearing Aid Benefit* (APHAB)[9], *Glasgow Hearing Aid Benefit Profile* (GHABP)[10], *International Outcome Inventory for Hearing Aids* (IOI-HA)[11], and *Audio Process Satisfaction Questionnaire* (APSQ)[12]. These questionnaires were not designed exclusively to assess the satisfaction of BAHA users.

The APSQ questionnaire used in the studies was developed specifically to assess user satisfaction with their audio processor. This questionnaire assesses the users' satisfaction and comfort while using the device, their social life, and the usability of the audio processor. Although its use has not been demonstrated, it was developed for users of implantable devices, highlighting that its development and validation are recent[12].

Conversely, in 2011, the literature introduced the *Bone-Anchored Hearing Aid Questionnaire* (BAHA)[13], designed to assess the satisfaction of BAHA users. This questionnaire, in English, is composed of 13 questions that measure the satisfaction of users of percutaneous or transcutaneous BAHAs, quantifying satisfaction with daily use of this resource and the improvement in quality of life. It was derived from the *Entific Medical Systems Questionnaire* (EMSQ)[14]. This questionnaire was selected because it presents simple, everyday information, aiding professional decision-making to allow assistance to individuals in both public and private healthcare settings.

The number of translations and cross-cultural adaptations of foreign instruments has increased significantly in recent years, enabling their application in different cultural contexts. This practice allows the data achieved to accurately reflect the constructs they aim to measure, besides enabling comparisons between different populations. The adoption of previously standardized instruments contributes to save time and financial resources, avoiding the need to develop new instruments from the onset[15]. However, the translation and adaptation process should be carefully performed, following a robust methodology at all stages, to ensure the validity, reliability, and effectiveness of the resulting instrument.

Concerning the questionnaires, literal translation from one language to another is not enough to ensure their validity in a different population, thus requiring a process of cross-cultural adaptation to ensure the equivalence of the new version in relation to the original instrument[16]. Although cross-cultural adaptation maintains the validity of the original instrument, it is possible to conclude, with greater confidence, whether this objective has been achieved when the validity of the version is objectively measured. In this case, content validity is the property most likely to be measured[17].

In Brazil, to date, the questionnaires available for users of bone-anchored hearing aids (BAHA) assess various aspects, without a specific focus on measuring the "satisfaction" construct. Also, existing instruments were not designed considering the particularities of this population. Considering this scenario, the present study aimed to perform the translation and cross-cultural adaptation of the *Bone-Anchored Hearing Aid Questionnaire* (BAHA) into Brazilian Portuguese, on users of bone-anchored hearing aids, using international recommendations to achieve semantic, idiomatic, conceptual and cultural correspondences, with content understanding by the target population and acceptable internal consistency.

METHODS

Initially, authorization was obtained from the author of the Bone-Anchored Hearing Aid Questionnaire (BAHA), developed in English, for translation into Portuguese. Approval was also obtained from the Institutional Review Board to conduct the study (report number 5.682.689), including application of the Informed Consent Form for participant consent.

The stages of translation and cross-cultural adaptation process followed the methodology proposed by the authors[16], widely recognized in the literature for this type of procedure. It should be noted that the authors of the original instrument did not provide specific guidelines for translation, thus a standardized methodological strategy was adopted.

Translation

This stage was performed by two translators, both native speakers of Brazilian Portuguese and fluent in English. Translator 1 (T1) was a speech-language pathologist with PhD and experience with BAHA, and the second translator (T2) was a graduate in Translation and English teacher, without knowledge on the topic. The translators and back translators performed the translation and back translation independently and with full autonomy.

Translations synthesis

At this stage, the two translators and the researcher synthesized the results of translation of the original instrument and the newly created versions. A synthesis of these translations (T-12) was produced by consensus.

Back translation

The T-12 version was sent to two bilingual translators, native English speakers fluent in the target language (Portuguese) and blinded to the original version. They produced the back translations (BT1 and BT2) and verified if the content of the synthesized version was similar to the original instrument.

Assessment by the expert board

This step was conducted by video call, with participation of a methodologist graduate in Languages with knowledge on the translation and cross-cultural adaptation process, a speech-language pathologist with postgraduate degree and experience with BAHA, the translators and back translators, besides the researcher who synthesized the translation. The objective was to produce the final version of the instrument for pre-testing. The translated versions were analyzed for semantic equivalence (vocabulary and grammar between the two languages), real meaning (denotation) and subjective meaning (connotation), idiomatic equivalence (proposing substitutes for expressions that were difficult to translate), cultural or experiential equivalence (proposing substitutes from an original item to a similar item that exists in the target culture), and conceptual equivalence (for words with different meanings in different cultures) with the original questionnaires in English[18].

Pretesting

The pretesting stage aimed to identify possible inconsistencies and assess the quality of adaptation and applicability of the instrument. Thirty individuals with ear malformations or chronic otitis media were invited to participate by email or telephone, meeting the following eligibility criteria: adult individuals; users of percutaneous or transcutaneous BAHA for at least six months; without other associated pathologies; and with internet access. Individuals using other implantable devices; those with cognitive, neurological, or psychiatric disorders; and those without internet access were excluded from the sample.

The translated questionnaire was sent to participants through *Google Forms*, allowing them to consent to participate and respond. Then, participants could assess the clarity of language; appropriateness of language for age and social level; and item understanding, indicating the responses by scores on a 5-point Likert scale (1 - no, 2 - little, 3 - partially, 4 - almost completely, and 5 - completely) to assess the need for item modification and response.

The content analysis was performed by calculating the Content Validity Coefficient (CVC)[19] for each item in the instrument (CVC_c) and for the instrument as a whole (CVC_t). The values obtained were compared to a scale from 0.0 to 1.00. An item with a value lower than 0.80 represented unacceptable validity; equal to or greater than 0.80 and lower than 0.90 was considered satisfactory; a score equal to or greater than 0.90 to 1.00 was classified as excellent. Additionally, the result of suggested modifications to each item was verified when it was below the 90% reference level; the appropriateness of accepting or rejecting the suggestion was considered.

Submission of reports to developers

The reports and forms were presented to developers, demonstrating the similarity of content of the final questionnaire compared to the original.

RESULTS

Representatives of the target population (judges), a total of 30 users of BAHA, had a mean age of 27 years, being 53% males. Regarding education, 67% had completed high school, 13% had completed higher education, 7% completed elementary school, and 13% had not completed their studies. Concerning socioeconomic level, 77% were from low and 23% middle social class[20]. Regarding the type of hearing loss on the side with BAHA, 53% had conductive hearing loss and 47% had mixed hearing loss[21]. Concerning the degree, most had severe hearing loss (57%), followed by moderate (23%), profound (13%), and mild (7%)[22].

The results of the translation and cross-cultural adaptation process of the original *Bone-Anchored Hearing Aid Questionnaire* from English into Brazilian Portuguese, considering the stages of translation, synthesis of translation, back-translation, expert board, and pre-testing, are presented in Chart 1.

Overall, in the translation and cross-cultural adaptation process, the final version presented semantic, idiomatic, experimental, and conceptual equivalence to the original questionnaire, providing clear and comprehensive content suitable for the validation stage. However, some points were discussed and subsequently accepted for the final version, as follows.

The first observation concerns the nomenclature used in item 1, which refers to the device in the final version of the questionnaire. This topic was widely discussed by judges at the expert board meeting, conducted online, since to date there is no scientific consensus on this subject. It was decided to refer to the device as a bone-anchored hearing aid, a term recommended by the Brazilian Academy of Audiology.

In item 3, the alternative "*no*" was removed because it had the same meaning as the alternative "*no difference*", both interpreted as "lack of difference". It should be noted that this adjustment was made with consent of the questionnaire author.

The wording of item 4 was changed, replacing "*your satisfaction or dissatisfaction*" with "your level of satisfaction". The response scale was also reversed from 10 to 1 for 1 to 10, achieving greater coherence in response magnitude.

In items 5 and 6, the translators changed the term "*discussion*" to "in talking", since the term "discussion" would suggest a fight between people. However, the board opted for "when talking", for better linguistic equivalence.

Chart 1. Results of the translation and cross-cultural adaptation process of the *Bone-Anchored Hearing Aid Questionnaire* for Portuguese language

ITEM (ORIGINAL VERSION IN ENGLISH)	SYNTHESIS OF TRANSLATIONS INTO BRAZILIAN PORTUGUESE	SYNTHESIS OF BACK TRANSLATIONS INTO ENGLISH	EXPERT BOARD: PRELIMINARY VERSION
1) *How many days a week do you use your* BAHA*?*	1) Quantos dias por semana você usa sua Prótese Auditiva Ancorada no Osso (PAAO)?	1) *How many days a week do you use your Bone-Anchored Hearing Aid* (BAHA)*?*	1) Quantos dias por semana você usa sua **Prótese Auditiva Ancorada no Osso (PAAO)**?
- every day (7 days)	- todos os dias (7 dias)	*- every day (7 days)*	- todos os dias (7 dias)
- almost every day (5-6 days per week)	- quase todos os dias (5-6 dias por semana)	*- almost every day (5-6 days a week)*	- quase todos os dias (5-6 dias por semana)
- from time to time (3-4 days per week)	- de vez em quando (3-4 dias por semana)	*- once in a while (3-4 days a week)*	- de vez em quando (3-4 dias por semana)
- sometimes (1-2 days per week)	- às vezes (1-2 dias por semana)	*- sometimes (1-2 days a week)*	- às vezes (1-2 dias por semana)
- never	- nunca	*- never*	- nunca
2) *How many hours per day do you wear your* BAHA*?*	2) Quantas horas por dia você usa sua Prótese Auditiva Ancorada no Osso (PAAO)?	2) *How many hours a day do you use your Bone-Anchored Hearing Aid* (BAHA)*?*	2) Quantas horas por dia você usa sua Prótese Auditiva Ancorada no Osso (PAAO)?
- more than 8 hrs per day	- mais de 8 horas por dia	*- more than 8 hours a day*	- mais de 8 horas por dia
- 4 to 8 hrs per day	- 4 a 8 horas por dia	*- 4-8 hours a day*	- 4 a 8 horas por dia
- 2 to 4 hrs per day	- 2 a 4 horas por dia	*- 2-4 hours a day*	- 2 a 4 horas por dia
- less than 2 hrs per day	- menos de 2 horas por dia	*- less than 2 hours a day*	- menos de 2 horas por dia
3) *Has your quality of life been improved by the* BAHA*?*	3) Sua qualidade de vida melhorou utilizando a Prótese Auditiva Ancorada no Osso (PAAO)?	3) *Has your quality of life improved because of the Bone-Anchored Hearing Aid* (BAHA)*?*	3) Sua qualidade de vida melhorou utilizando o BAHA?
- yes	- sim	*- yes*	- sim
*- **no***	- não	*- no*	**- às vezes sim, às vezes não**
- sometimes yes, sometimes no **- no difference**	- às vezes sim, às vezes não	*- sometimes yes, sometimes no*	- sem diferença
4) *Score your overall **satisfaction or dissatisfaction** with the* BAHA *on the numerical scale.*	4) Pontue de uma forma geral sua satisfação ou insatisfação com a Prótese Auditiva Ancorada no Osso (PAAO) na escala numérica.	4) *Rate your general level of satisfaction/ dissatisfaction with the Bone-Anchored Hearing Aid* (BAHA)	4) Pontue de uma forma geral **seu nível de satisfação** com a PAAO na escala numérica.
-10: very satisfied	-10: muito satisfeito	*- 10: very satisfied*	-1: insatisfeito
- 9	- 9	*- 9*	- 2
-8	-8	*-8*	-3
-7	-7	*-7*	-4
-6	-6	*-6*	- 5: sem diferença
- 5: no difference with or without BAHA	- 5: sem diferença com a PAAO	*- 5: no difference with the* BAHA	- 6
- 4	- 4	*- 4*	-7
-3	-3	*-3*	-8
-2	-2	*-2*	-9
- 1: dissatisfied	- 1: insatisfeito	*- 1: dissatisfied*	- 10: muito satisfeito
How would you rate the usefulness of the BAHA *in the following situations?*	Como você classificaria a utilidade da Prótese Auditiva Ancorada no Osso (PAAO) nas seguintes situações?	*How would you rate the Bone-Anchored Hearing Aid* (BAHA) *in the following situations?*	Como você classificaria a utilidade da Prótese Auditiva Ancorada no Osso (PAAO) nas seguintes situações?
*5) **Discussion** with a single person:*	5) Conversa com uma única pessoa:	*5) Talking to one person on their own:*	5) **Ao conversar** com uma única pessoa:
- excellent	- excelente	*- excellent*	- muito bom
- very good	- muito bom	*- very good*	- bom
*- **moderate***	- moderado	*- moderate*	- **razoável**
- bad	- ruim	*- bad*	- ruim
- very bad	- muito ruim	*- very bad*	- muito ruim
6) ***Discussion** in a group:*	6) Em conversa com um grupo:	6) *Talking in a group:*	6) **Ao conversar** com um grupo:
- excellent	- excelente	*- excellent*	- muito bom
- very good	- muito bom	*- very good*	- bom
*- **moderate***	- moderado	*- moderate*	-**razoável**
- bad	- ruim	*- bad*	- ruim
- very bad	- muito ruim	*- very bad*	- muito ruim

Subtitle: In bold: modified, deleted word/expression.

Chart 1. Continued...

ITEM (ORIGINAL VERSION IN ENGLISH)	SYNTHESIS OF TRANSLATIONS INTO BRAZILIAN PORTUGUESE	SYNTHESIS OF BACK TRANSLATIONS INTO ENGLISH	EXPERT BOARD: PRELIMNIARY VERSION
7) *Listening to music:*	7) Ouvindo música:	7) *Listening to music:*	7) Ouvindo música:
- excellent	- excelente	*- excellent*	- muito bom
- very good	- muito bom	*- very good*	- bom
*- **moderate***	- moderado	*- moderate*	- **razoável**
- bad	- ruim	*- bad*	- ruim
- very bad	- muito ruim	*- very bad*	- muito ruim
8) *Listening to radio or television:*	8) Ouvindo rádio ou televisão:	8) *Listening to the radio or the television:*	8) Ouvindo rádio ou televisão:
- excellent	- excelente	*- excellent*	- muito bom
- very good	- muito bom	*- very good*	- bom
*- **moderate***	- moderado	*- moderate*	- **razoável**
- bad	- ruim	*- bad*	- ruim
- very bad	- muito ruim	*- very bad*	- muito ruim
9) ***How do you find the* BAHA *from an esthetic point of view?***	9) Como você vê a Prótese Auditiva Ancorada no Osso (PAAO) do ponto de vista estético?	9) *How do you find the aesthetics of the Bone-Anchored Hearing Aid* (BAHA)*?*	9) **Qual a sua opinião** sobre a aparência da sua PAAO?
a) Generally	a) Em geral	a) *Generally*	a) Em geral:
- very esthetic	- muito estético	*- very stylish*	- Muito discreta
- discreet and not bothersome	- discreto e não incômodo	*- discreet; it doesn't bother me*	- Discreta e não incômoda
- not very discreet, bothersome	- não muito discreto, incômodo	*- not very discreet; it bothers me*	- Não muito discreta, incomoda
- very bothersome	- muito incômodo	*- it bothers me a lot*	- Muito incômoda
b) Compared to conventional hearing aids:	b) Em comparação com aparelhos auditivos convencionais:	*b) Compared to conventional hearing aids:*	b) Em comparação com aparelhos auditivos convencionais:
- nicer	- melhor	*- better*	- melhor
- less nice	- pior	*- worse*	- sem diferença
- no difference	- sem diferença	*- no different*	- pior
10) *How do you rate handling the* BAHA *(clipping it onto the bone implant)?*	10) Como você avalia o manuseio da Prótese Auditiva Ancorada no Osso (PAAO), (ao fixar/conectar) no implante ósseo?	*10) How would you rate the handling of the Bone-Anchored Hearing Aid* (BAHA) *when attaching or connecting it to the bone implant?*	10) Como você avalia o manuseio da PAAO ao fixar/ conectar no implante ósseo?
- very easy	- muito fácil	*- very easy*	- muito fácil
- easy	- fácil	*- easy*	- fácil
- okay	- oK	*- okay*	- oK
- difficult	- difícil	*- difficult*	- difícil
- very difficult	- muito difícil	*- very difficult*	- muito difícil
11) *Which situation is the* BAHA *most useful in?*	11) Em qual situação (de comunicação) a Prótese Auditiva Ancorada no Osso (PAAO) é mais útil?	11) *In what (communication) situation is the Bone-Anchored Hearing Aid* (BAHA) *most useful?*	11) Em qual situação (de comunicação) a Prótese Auditiva Ancorada no Osso (PAAO) é mais útil?
- in noise	- ambiente com ruído	*- in a noisy environment*	- ambiente com ruído
- in group	- em grupo	*- in a group*	- em grupo
*- **one-to-one***	- conversa com uma pessoa	*- when talking to one person*	- **conversa com uma pessoa**
- all these situations	- todas essas situações	*- in all these situation*	- todas essas situações
12) *Which situation is the* BAHA *not useful in?*	12) Em qual situação o Prótese Auditiva Ancorada no Osso (PAAO) não é útil?	12) *In what (communication) situation is the Bone-Anchored Hearing Aid* (BAHA) *not useful?*	12) Em qual situação o Prótese Auditiva Ancorada no Osso (PAAO) não é útil?
- in noise	- ambiente com ruído	*- in a noisy environment*	- ambiente com ruído
- in group	- em grupo	*- in a group*	- em grupo
- one-to-one	- conversa com uma pessoa	*- when talking to one person*	- conversa com uma pessoa
- always useful	- sempre útil	*- always useful*	- sempre útil
13) *Would you do it again if you had to?*	13) Você faria de novo se precisasse?	13) *If you needed to, would you do it again?*	13) Você faria de novo se precisasse?
- yes	- sim	*- yes*	- sim
- no	- não	*- no*	- não
*If you **met any problems,** don't hesitate to ask. Thank you for your contribution to the study.*	Se você **encontrou algum problema**, não hesite em perguntar. Obrigado por sua contribuição para o estudo.	*If you have any problems, please do not hesitate to ask. Thank you for participating in the study.*	Se você **teve alguma dúvida**, não hesite em perguntar. Obrigado por sua contribuição para o estudo.

Subtitle: In bold: modified, deleted word/expression.

In items 5, 6, 7, and 8, the term "*moderate*" was changed to "reasonable," not altering the meaning but facilitating comprehension. The response options were also changed to make them more understandable to the target population.

The wording of item 9, "*How do you find the BAHA from an aesthetic point of view?*", initially translated as "How do you see the bone-anchored hearing aid (BAHA) from an aesthetic point of view?", was changed to "What is your opinion about the appearance of your BAHA?". The answers to this item were also changed, from "*very discrete*" to "very aesthetic." To achieve logic and facilitate understanding in the alternative for item 9b, the English terms "*nicer*," "*less nicer*" and "*no difference*" were replaced by the Portuguese terms "better", "worse" and "no difference."

In item 11, the expression "*one to one*" was changed to "talk with one person" due to the unanimous understanding of the expert board that this term is more understandable in communication situations in Portuguese language.

In item 14, the expression "*met any problems*" was translated to "found some problem", but this expression was adapted by the expert board to "if you have any doubt", to enhance the understanding in Portuguese language.

The final version of the questionnaire, titled Q-BAHA for Brazilian Portuguese, after translation and cross-cultural adaptation process with the modifications proposed by the expert board and pretesting participants, is presented in Chart 2.

The results of the Content Validity Coefficient (CVC) of the pretesting stage, with assessment by representatives of the target population regarding the domains of clarity of language, appropriateness of language for the age range and social level, understanding, and appropriateness of terms, are described in Table 1.

Considering the results of the content analysis, it was observed that all items in the questionnaire were well-scored by the target population in the pretesting stage, with scores above 90%, thus no modifications were suggested.

Chart 2. Final version in Brazilian Portuguese of the questionnaire *Prótese Auditiva Ancorada no Osso - Q-BAHA*

Como responder: preencha a sua resposta com um X ou escreva as suas respostas nas linhas.
1- Quantos dias por semana você usa sua Prótese Auditiva Ancorada no Osso (PAAO)?
( ) todos os dias (7 dias)
( ) quase todos os dias (5-6 dias por semana)
( ) de vez em quando (3-4 dias por semana)
( ) às vezes (1-2 dias por semana)
( ) nunca
2 - Quantas horas por dia você usa sua Prótese Auditiva Ancorada no Osso (PAAO)?
( ) mais de 8 horas por dia
( ) 4 a 8 horas por dia
( ) 2 a 4 horas por dia
( ) menos de 2 horas por dia
3- Sua qualidade de vida melhorou utilizando o Q-BAHA?
( ) sim
( ) às vezes sim, às vezes não
( ) sem diferença
4- Pontue de uma forma geral seu nível de satisfação com a PAAO na escala numérica:
( ) 1 insatisfeito
( ) 2
( ) 3
( ) 4
( ) 5 sem diferença
( ) 6
( ) 7
( ) 8
( ) 9
( ) 10 muito satisfeito
Como você classificaria a utilidade da Prótese Auditiva Ancorada no Osso (PAAO) nas seguintes situações?
5- Ao conversar com uma única pessoa:
( ) muito bom
( ) bom
( ) razoável
( ) ruim
( ) muito ruim
6- Ao conversar com um grupo:
( ) muito bom
( ) bom
( ) razoável
( ) ruim
( ) muito ruim

Chart 2. Continued...

Como responder: preencha a sua resposta com um X ou escreva as suas respostas nas linhas.
7- Ouvindo música: ( ) muito bom ( ) bom ( ) razoável ( ) ruim ( ) muito ruim 8- Ouvindo rádio ou televisão: ( ) muito bom ( ) bom ( ) razoável ( ) ruim ( ) muito ruim 9- Como você vê a Prótese Auditiva Ancorada no Osso (PAAO) do ponto de vista estético? a) Em geral ( ) muito estético ( ) discreto e não incômodo ( ) não muito discreto, incômodo ( )muito incômodo b) Em comparação com aparelhos auditivos convencionais ( ) melhor ( ) pior ( ) sem diferença 10- Como você avalia o manuseio da PAAO ao fixar/ conectar no implante ósseo? ( ) muito fácil ( ) fácil ( ) oK ( ) difícil ( ) muito difícil 11- Em qual situação (de comunicação) a Prótese Auditiva Ancorada no Osso (PAAO) é mais útil? ( ) ambiente com ruído ( ) em grupo ( ) conversa com uma pessoa ( ) todas essas situações 12- Em qual situação a Prótese Auditiva Ancorada no Osso (PAAO) não é útil? ( ) ambiente com ruído ( ) em grupo ( ) conversa com uma pessoa ( ) sempre útil 13- Você faria de novo se precisasse? ( ) sim ( ) não Se você teve alguma dúvida, não hesite em perguntar. Obrigada por sua contribuição para o estudo

Table 1. Results of the Content Validity Coefficient concerning the domains achieved for the target population (N 30) for all items in the questionnaire

Item	Clarity of language	Appropriateness of language for age range	Appropriateness of language for socioeconomic level	Understanding	Appropriateness of terms
1	0.98	0.96	0.95	0.91	0.93
2	0.98	0.96	0.97	0.98	0.98
3	0.98	0.98	0.97	0.99	0.99
4	0.96	0.96	0.95	0.97	0.97
5	0.98	0.97	0.97	0.99	0.99
6	0.96	0.96	0.96	0.98	0.97
7	0.98	0.97	0.97	0.99	0.99
8	0.97	0.97	0.97	0.98	0.98
9	0.97	0.97	0.97	0.98	0.98
10	0.98	0.97	0.98	0.98	0.99
11	0.98	0.97	0.97	0.98	0.98
12	0.94	0.94	0.94	0.94	0.95
13	0.95	0.96	0.96	0.95	0.95

DISCUSSION

Cross-cultural adaptation involves mandatory steps of translation of the health measurement instrument. This means that a literal translation of words from one language to another is not sufficient; adaptation to the cultural context and lifestyle of the target population is also essential[16,23]. In this sense, it has been highlighted[24] that the universalist approach, in which understanding a culture has a significant impact on measurement in different populations, requires cross-cultural adaptation to ensure that the purpose of the original questionnaire is complete, when applied in the language to which it was adapted.

The development of original questionnaires usually includes a systematic process of literature review, theoretical definition of the construct to be measured, item development, and subsequent analysis by experts. This analysis aims to validate the content of items for relevance, clarity, coherence, and comprehensiveness, ensuring that each item adequately represents the domain under investigation. The expert board typically conducts qualitative and/or quantitative assessments using indices as the Content Validity Index (CVI) or the Content Validity Coefficient (CVC). For the original instrument used in this study, the Bone-Anchored Hearing Aid Questionnaire (BAHA-Q), the validation process included administering the questionnaire to a sample of 61 adults using percutaneous hearing aids, focusing on measuring satisfaction and perceived functional benefit. Although the original article does not specifically detail the expert validation method, practical field analysis based on functional and satisfaction results confirmed its clinical applicability to the target population.

In the current scenario of scientific publication, several strategies are available for the translation and cross-cultural adaptation process, with emphasis on all stages, aiming to minimize errors and losses of the original characteristics of the instrument that may occur during the process[25].

Although there is no gold standard model for translation and cross-cultural adaptation, the translation, back translation, review by an expert board, and pretesting are four essential and recommended steps to ensure the reliability and thus the validity of the original instrument[26].

Recent literature presents several options for translation and cross-cultural adaptation methods. Therefore, the six-step method[16] was chosen for this study, considering its extensive use and detailed steps, which impacts the reliability of reproducibility[17].

In the present study, all steps mentioned in the method were followed, including the synthesis of translations and the submission of all reports and forms to the developers of the original material. These steps are only aimed at achieving equivalence between the original and final versions, specifically semantic, idiomatic, experiential, and conceptual equivalences. This aimed to minimize difficulties caused by multiple meanings, besides grammatical issues that could arise during the process and thus impair the understanding of the instrument by members of the target population[25]. For example, the term "*moderate*" was replaced by "reasonable," facilitating understanding in Portuguese.

When searching for terminological equivalences from English to Portuguese, this study prioritized semantic, idiomatic, experiential, and conceptual equivalences. Therefore, the members of the expert board focused their observations on these types of equivalences, and the decisions of all judges were guided by the agreement between terms in both languages[27].

Overall, the translated and back translated versions of the Q-BAHA revealed similarities in general and referential meaning, achieving success in the final stage of the process. However, some modifications (adaptations, deletions and insertions of words and phrases) were made, since some terms did not reflect the Brazilian reality. Thus, the board solved any disagreements and made changes when necessary.

Specifically, regarding the expert board, its importance in facilitating the exchange of information among members was strongly noted, providing the best translation for each term, aiming at adapting to the Brazilian context.

The pretesting stage on the target population of the instrumental is an essential step in the cross-cultural adaptation process, since it allows the identification of any difficulties related to completion, application and understanding of items. This stage enables the collection of direct information, considering the specificities of the population involved. Users of bone-anchored hearing aids are a sample with unique characteristics, often exposed to social stigmas resulting from ear malformations, which may influence the perception of satisfaction with the device, besides interfering variables such as age group and socioeconomic level[16,28]. The pretesting contributed to greater methodological rigor and consistency in the cross-cultural adaptation process, maintaining the fidelity to the original instrument. The participants reported no difficulties in understanding or completing the questionnaire items.

Researchers state that, in adequate and effective translation, experimental equivalence is important to verify if the terms used in the instrument are consistent with the reality experienced by the target population, within their cultural context[29].

Regarding the sample composition of the target population/judges in pretesting, different age groups and educational levels were included, to ensure not only checking the understanding of items, but also their applicability in a diverse sample[16,17].

In summary, regarding the translation and cross-cultural adaptation process, it is noteworthy that the availability and standardization of new instruments provide an important option for professional use in clinical practice, collecting valid information for the benefit of science[17].

This study revealed that the items were satisfactory, without need for changes to facilitate understanding by the specific population.

As a way to assess the instrument, there is the option of verifying validation, which refers to whether an instrument measures exactly what it aims to measure. Effective validation is of the content type, which adequately reflects the assessment of the representativeness of a sample of items concerning a defined universe or content domain[30], which will be added at a later stage, i.e., in the validation of the measurement instrument.

The questionnaire, translated and cross-culturally adapted into Brazilian Portuguese, called the *Prótese Auditiva Ancorada no Osso (Q-BAHA)*, is expected to contribute to the field of Audiology by providing another tool for subjective outcome assessment to assess the "satisfaction" construct among users of BAHA.

CONCLUSION

The study produced the *Prótese Auditiva Ancorada no Osso (Q-BAHA)* questionnaire, which was translated and cross-culturally adapted and can now be applied in the subsequent stage of psychometric assessment. The resulting instrument demonstrated satisfactory semantic, idiomatic, experiential, and conceptual equivalence, as assessed by the expert board, besides presenting clarity and appropriateness for the target population, as perceived by users during pretesting.

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