Translation and cross-cultural adaptation of the "Vanderbilt Pediatric Dizziness Handicap Inventory for Patient Caregivers" questionnaire to Portugal for pediatric vertigo evaluation

Original Article

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Abstract

Vestibular disorders in childhood may lead to avoidance behaviours, with associated adverse effects, and thus rapid diagnosis is important. This study aims to translate to European Portuguese and culturally adapt the "Vanderbilt Pediatric Dizziness Handicap Inventory for Patient caregivers" (DHI-PC) questionnaire to Portugal. The methodological sequence used was based on the steps recommended in the international literature. Three focus groups were conducted to evaluate the preservation of the construct and the correct understanding of sentences and expressions. The team responsible for the adaptation reached consensus taking into account the changes discussed in the focus groups, with the purpose of achieving semantic, idiomatic, experimental, and conceptual equivalence, which would ensure an accurate translation and an adequate cultural adaptation. For its use in clinical practice, validation of the instrument will be carried out in a second phase.
Keywords: child; dizziness; surveys and questionnaires; focus groups; caregivers; Portugal

Introduction

Symptoms such as dizziness and/or vertigo and unsteadiness, although more common in adults, are not rare in childhood[1,2]. The presentation of vertigo varies according to the child's age. In most cases, a vestibular deficit does not cause a marked disability in children, but it may delay the accomplishment of some developmental stages. The affected children can often be labeled as clumsy or having poor coordination. According to the literature, approximately 70% of the cases of childhood

dizziness and vertigo are due to benign paroxysmal vertigo of childhood (BPVC), vestibular migraine (VM), viral infection, head trauma, and otitis media[1,3,4]. Migraine, BPVC, and VM are the most common causes of these symptoms[1,2,5]. BPVC, which is considered a precursor of migraine, is the most common cause of vertigo in children aged up to six years, whereas VM manifests in older children [6]. Recently, the term BPVC has been replaced by the term "recurrent vertigo in childhood" by the Bárány Society[7]. The vestibular system appears to be important for normal cognitive and emotional development of children[8]. Vestibular disorders may lead to avoidance behaviors, with adverse effects on academic performance and quality of life[4]. Therefore, prompt diagnosis is important to resolve the condition or control the symptoms. Unlike adults, younger children have often not yet developed the language required to express the specific nature of their symptoms, duration of episodes, and what causes or accompanies them[2]. Moreover, vestibular tests (both clinical and neurophysiological) are not uniformly reliable in younger patients[6]. These difficulties hinder the determination of the origin and severity of the imbalance problem and may delay intervention[1,6].

There are several instruments to assess the presence, severity, and impact of vestibular symptoms in adults. However, few are currently available for use in the pediatric population. In 2015, McCaslin *et al.* adapted the dizziness handicap inventory (DHI) to be answered by the caretakers of children aged 5–12 years (DHI-PC) because, in the case of younger patients, caretakers provide the clinical history and help determine the balance deficit[1].

To our knowledge, the cultural adaptation of the DHI-PC for Portugal has never been performed. This study aimed to translate the Vanderbilt Pediatric Dizziness Handicap Inventory for Patient Caregivers (DHI-PC) into European Portuguese and culturally adapt it for use in Portuguese children with vestibular symptoms.

Materials and Methods

This study was conducted in a tertiary hospital in Lisbon between January and October 2021. The study was registered and approved by the ethics committee of the institution. The team that developed the original version of the instrument was asked, via e-mail, for formal consent for the translation and use of the instrument. The procedures followed were according to the regulations established by the Clinical Research and Ethics Committee and in accordance with the Helsinki Declaration of the World Medical Association.

The adaptation was based on the steps recommended by Beaton *et al.*[9], which have been previously used to translate and culturally adapt another questionnaire[10]. The methodological sequence was as follows: translation into Portuguese, discussion among focus groups, back-translation into English, and validation by the team that developed the original instrument. Three focus groups were created to evaluate the preservation of the construct and correct understanding of sentences and expressions. Written informed consent was obtained before creating the focus groups. The focus groups were as follows: a group of caretakers who accompanied the children to the vertigo clinic, a group of children visiting the vertigo clinic aged 8–17 years, and a group of teachers from the institution's school. The focus groups comprised eight children, sixteen caretakers, and four teachers from the institution's school. The children were aged 8–15 years (mean age of 12 years), and half of them were girls. Parents/caretakers of the children who did not understand the Portuguese language and children with developmental delays, neurological morbidities, or orthopedic limitations were excluded from the study.

The original version of the instrument contains 21 questions to be answered by the child's caretaker. A total score in the DHI-PC between 0 and 16 indicates that there is no limitation to the child's daily activities due to a vestibular problem. A score from 16 to 26 indicates a mild limitation, while a score between 26 and 43

Figure 1
Vanderbilt Pediatric Dizziness Handicap Inventory for Patient Caregivers (DHI-PC) (original version)[1]

Name:	Date:

VANDERBILT PEDIATRIC DIZZINESS HANDICAP INVENTORY (DHI)
(Age 5 - 12)

Instructions: The purpose of this questionnaire is to identify difficulties that your child may be experiencing because of his or her dizziness or unsteadiness. Please answer "yes", "no" or "sometimes" to each question.
Answer each question as it pertains to your child's dizziness problem only.

	Yes (4)	Sometimes (2)	No (0)
1. Does your child's problem make him/her feel tired?			
2. Is your child's life ruled by his/her problem?			
3. Does your child's problem make it difficult for him/her to play?			
4. Because of his/her problem, does your child feel frustated?			
5. Because of his/her problem, has your child been embarrassed in front of others?			
6. Because of his/her problem, is it difficult for your child to concentrate?			
7. Because of his/her problem, is your child tense?			
8. Do other people seem irritated with your child's problem?			
9. Because of his/her problem, does your child worry?			
10. Because of his/her problem, does your child feel angry?			
11. Because of his/her problem, does your child feel ‘‘down’’?			
12. Because of his/her problem, does your child feel unhappy?			
13. Because of his/her problem, does your child feel different from other children?			
14. Does your child’s problem significantly restrict his/her participation in social or educational activities, such as going to dinner, meeting with friends, field trips, or to parties?			
15. Because of your child’s problem, is it difficult for him/her to walk around the house in the dark?			
16. Because of his/her problem, does your child have difficulty walking up stairs?			
17. Because of his/her problem, does your child have difficulty walking one or two blocks?			
18. Because of his/her problem, does your child have difficulty riding a bike or scooter?			
19. Because of his/her problem, does your child have difficulty reading or doing schoolwork?			
20. Does your child’s problem make it difficult to successfully do activities that others his/her age can do?			
21. Because of his/her problem, does your child have trouble concentrating at school?			
Version 2		**Total Score**	

reflects a moderate limitation. Finally, a score higher than 43 indicates a severe limitation[1].

Results

The original version of the DHI-PC (Figure 1) was translated into European Portuguese by two independent bilingual translators who were independent users of the English language and whose mother tongue was that to which the DHI-PC was translated (neither translators had medical training). The two translators and the research team (composed of six otorhinolaryngologists) together revised the translations until reaching a consensus for the first version in European Portuguese (consensus version of the DHI-PC). The pre-test participants of the focus groups were questioned regarding their understanding of the items in the questionnaire—dubious or equivocal aspects—and were asked to make observations and/or suggestions for changes. The discussion among the groups continued until no new information was presented. The team responsible for the adaptation reached a consensus based on the alterations discussed in the focus groups to achieve semantic, idiomatic, experimental, and conceptual equivalence that ensured an accurate translation and adequate cultural adaptation. This was the pre-final consensus version of the instrument in Portuguese for use in children and adolescents (Figure 2).

Items 1, 7, 8, 12, and 18 were adapted by the research team (Table 1) after discussions within the focus groups. Regarding the questionnaire instructions, the panel of specialists decided to use the term "tontura" (dizziness) rather than "tontura/vertigem" (dizziness/vertigo) to translate "dizziness." The maximum DHI-PC score in the study population was 72 points.

This pre-final version was back-translated into the original language by two independent bilingual translators who had not seen the original version, had no medical training, and whose mother tongue was that of the original questionnaire. The final consensus version of the DHI-PC was based on the two translations. The back-translations were sent to the team that developed the original instrument for review and formal approval.

Discussion

The diagnosis of vestibular disorders is usually based on the clinical history and symptom characterization, which may be difficult in pediatric patients and can thus hinder diagnosis.

In the adult population, the DHI[11] has been used to quantify the impact of balance disorders and has been translated and validated in several countries. Validation into the Portuguese language and for the Portuguese population was performed by Garcia *et al.* in 2008[12]. The DHI-PC, an adaptation for the pediatric population, is intended to be answered by the children's

Table 1
Adaptation of the questionnaire's items

Items	Literal translation	Adapted translation
Item 1)	O problema do seu filho fá-lo sentir-se cansado?	O seu filho sente-se mais cansado por causa deste problema?
Item 7)	Devido a este problema o seu filho fica tenso?	Devido a este problema o seu filho fica ansioso?
Item 8)	As outras pessoas ficam enervadas com o problema do seu filho?	As outras pessoas ficam ansiosas com o problema do seu filho?
Item 12)	Este problema faz com que o seu filho se sinta infeliz?	Este problema faz com que o seu filho se sinta triste?
Item 18)	Devido a este problema, o seu filho tem dificuldade em andar de bicicleta?	Devido a este problema, o seu filho tem dificuldade em andar de bicicleta, trotinete ou patins?

Figure 2
Portuguese version of the Vanderbilt Pediatric Dizziness Handicap Inventory for Patient Caregivers (DHI-PC)

Nome: Data:

INVENTÁRIO PEDIÁTRICO VANDERBILT SOBRE HANDICAP DE VERTIGEM (DHI-PC)
(5 - 12 Anos)

Instruções: O Objetivo deste questionário é identificar as difilculdades que o seu filho/a pode ter devido à ocorrência de tontura ou desequilibrio. Indique, por favor, em cada pergunta, "sim", "por vezes" ou "não" conforme o caso.

	Sim (4)	Por vezes (2)	Não (0)
1. O seu filho sente-se mais cansado por causa deste problema?			
2. A vida diária do seu filho é prejudicada por este problema?			
3. Este problema dificulta as brincadeiras do seu filho?			
4. O seu filho sente-se frustrado devido a este problema?			
5. Devido a este problema, o seu filho sente-se envergonhado à frente de outras pessoas?			
6. Este problema causa dificuldades de concentração ao seu filho?			
7. Devido a este problema o seu filho fica ansioso?			
8. As outras pessoas ficam ansiosas com o problema do seu filho?			
9. Este problema causa preocupação ao seu filho?			
10. Este problema faz com que o seu filho se sinta zangado?			
11. Este problema faz com que o seu filho se sinta em baixo?			
12. Este problema faz com que o seu filho se sinta triste?			
13. Este problema faz com que o seu filho se sinta diferente dos outros?			
14. Este problema afeta de forma significativa a participação do seu filho em atividades sociais ou educativas? (por ex.: comer fora, encontrar-se com amigos, viagens de estudo, ir a festas)			
15. Este problema causa dificuldade ao seu filho em andar às escuras?			
16. Este problema causa dificuldade ao seu filho em subir escadas?			
17. Este problema causa dificuldade ao seu filho em caminhar algum tempo?			
18. Devido a este problema, o seu filho tem dificuldade em andar de bicicleta, trotinete ou patins?			
19. Devido a este problema, o seu filho tem dificuldade em ler ou fazer os trabalhos da escola?			
20. Devido a este problema, o seu filho tem dificuldade em fazer as mesmas atividades que os outros da mesma idade?			
21. Devido a este problema, o seu filho tem dificuldade de concentração na escola?			
Versão 2		**Total**	

caretakers and can be used as the first step to assess the impact of a balance disorder on a child's daily life. Additionally, it helps determine the magnitude of the unsteadiness when the child's history is indicative or when they have a history of sensorineural hearing loss. It may also help the clinician determine whether it is necessary to refer the child for a formal evaluation of the vestibular function and monitor the response to the chosen treatment. The DHI-PC has been translated and subsequently validated to be used in the Korean pediatric population.[13]

The simple translation of a questionnaire can lead to erroneous interpretations because of cultural and idiomatic differences (9). Regarding the questionnaire instructions, the term "*tontura*" (dizziness) was used rather than "*tontura/vertigem*" (dizziness/vertigo) to translate "dizziness" for simplification and better understanding by the Portuguese population. Additionally, in item 7, the panel decided to replace "tenso"—the literal translation of the word "tense"—with the word "*ansioso*" (anxious). After the discussions in the focus groups, the committee of specialists decided to alter item 1, largely because most parents/caretakers erroneously interpreted the translation (Table 1). The correction of the sentence's structure allowed the retention of the original meaning while making it clearer. In items 8 and 12, the terms of "*enervadas*" (irritated) and "*infeliz*" (unhappy) in the literal translation were replaced because of the excessively negative connotation in European Portuguese. In item 18, the example "riding a scooter or roller skating" was finally translated as "*andar de trotinete ou patins*" instead of "riding a scooter" for a better adaptation to the reality of Portuguese children.

After the cultural adaptation of the DHI-PC, the next step was checking whether the new version retains the psychometric characteristics of the original instrument. It is important to evaluate the validity (discriminative capacity), reliability (item to total score correlations and internal consistency and test-retest reliability), and response to clinical change, which was a limitation of this study. This limitation will be overcome after evaluating the instrument's validity, making it possible to use the instrument in clinical practice or research.

The validation of this instrument is important for clinical use—the evaluation and follow-up of pediatric patients with symptoms of vertigo, unsteadiness, and/or dizziness. The clinical use of instruments that have already been validated internationally and then culturally adapted for use in Portugal allows comparison of the results because the instruments are used in countries with different cultural contexts.

Conclusion

The original version of the DHI-PC was translated and adapted for use in the pediatric population presenting with vestibular symptoms. Its validation, to be performed in the second stage, will allow its clinical use for the evaluation and follow-up of Portuguese children with vestibular disorders.

Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Data Confidentiality

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

Protection of humans and animals

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the 2013 Helsinki Declaration of the World Medical Association.

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Availability of scientific data

There are no datasets available, publicly related to this work.

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