Title: Translation to Yoruba and cross-cultural adaptation of the neck disability index with cognitive testing in patients with neck pain

Authors: Sokunbi TF, MSc, (PT),[1] Okafor UAC, MSc, (PT),[2] Olawale OA, PhD, (PT),[2] Akinfeleye AM, MSc (PT),[3] Lomas D, MSc, (PT).[1]

[1]Physiotherapy Department, Sheffield Hallam University, Collegiate Crescent, Sheffield, South Yorkshire, United Kingdom

[2]Physiotherapy Department, College of Medicine, University of Lagos, Lagos, Nigeria

[3] Physiotherapy Department, Lagos University Teaching Hospital, Idi-Araba, Lagos

Corresponding author: Sokunbi TF: Sheffield Hallam University, Collegiate Crescent, Sheffield, South Yorkshire, United Kingdom.

E-mail: topesokunbi@yahoo.com

Abstract

Background: The translation and cross-cultural adaptation of an instrument is considered important especially if the target population differs from the initial population for which the instrument was originally devised. Most functional scales and measures have yet to be adapted for use with a Yoruba population.

Objective: To translate and cross-culturally adapt the Neck Disability Index (NDI) to the Yoruba language and to validate it using the Cognitive Debriefing Approach with patients.

Methods: The NDI was translated into the Yoruba language and cross-culturally adapted for this target population following the Beaton et al. (2000) protocol. The Yoruba version of the NDI at its pre-final stage further underwent modification after cognitive interviews involving six patients of varying ages and occupations with neck pain to determine its face and content validity.

Results: The patients demonstrated adequate understanding of the Yoruba version of the NDI when cognitively assessed using concurrent and recurrent approaches; discrepancies were modified at every stage. Two out of ten constructs were cross-culturally adapted to suit the target population with modifications made to maintain the scale's conceptual meaning.

Conclusion: Cognitive testing proved useful in the translation and cross-cultural adaptation of the NDI to its Yoruba version with patients demonstrating adequate understanding. We recommend further psychometric testing be carried out to further establish the validity and reliability of the Yoruba version of the NDI.

Keywords: Neck Disability Index, Face Validity, Content Validity, Cognitive Debriefing Approach, Yoruba Language

Introduction

Neck pain affects about 19% of the population and is considered a societal burden (Macdermid et al., 2009). Makela et al. (1991) and Bovim, Schrader, and Sand et al.(1994) reported a frequency of about 34.4% of the population with complaints of neck pain lasting one month or longer, with a higher frequency in women as compared to men. These findings were found to be similar to those reported by Cote, Cassidy, and Corroll et al.(1998) and Graham et al. (2008), who stated that 26% to 71% of individuals experience neck pain during the course of their lives, and rates as high as 77.8% were discovered in females. Some suggested aetiological factors are a history of mental stress, physical stress and trauma (Makela et al., 1991; Linton, 2000). According to reports by Graham et al. (2008) and Gross et al. (2010), neck pain could lead to numerous instances of sick leave and visits to healthcare professionals as well as eventual loss of function.

The World Health Organisation (WHO) classification of Functioning, Disability and Health as reported by Dahl (2002) and Ustun et al. (2003) is aimed at shedding light on the consequences of disease on everyday life and functional activities and is seen as useful in the development of rehabilitation services and research. Thus, functional scales focusing on the measurement of the impact of disease on the performance of everyday tasks are now commonly employed by clinicians and researchers according to Fayers and Machin (2000) and Pietrobon et al. (2002) who listed the Neck Disability Index (NDI), Copenhagen Neck Functional Disability Scale (CNFDS), Northwick Park Scale (NPS), Neck Pain and Disability Scale (NPDS) and Patient Specific Functional Scale (PSFS) as the five standard scales commonly used for neck pain. Among these scales, the NDI was found to have been re-validated over time, in its original state, in various conditions and populations (Macdermid et al., 2009). In addition, it was found to have been more widely and successfully cross-culturally adapted to 22 languages, including Italian, Portugese, and Korean, with these versions also being declared valid and reliable after various psychometric testing (Cook et al., 2006; Aslan et al., 2008; Monticone et al., 2008; Vernon, 2008; Macdermid et al., 2009; Kyung-Jin et al., 2010). The NDI has, however, never been translated into a Nigerian language, which could mean that if this tool were to be used on a patient in Nigeria with little or no knowledge of the English language, it would have to be personally translated by the health professional. This could have a negative impact on the reliability of the scale (Corless, Nicholas, and Nokeset al., 2001). Furthermore, there may be slight cultural differences that could have an impact upon what a patient believes is important in everyday life (Bullinger et al., 1993; Herdman, Fox-Rushby and Badiaet al., 1997; Corless Nicholas, and Nokeset al., 2001).

The Yoruba language is one of the three major languages spoken by Nigerians (Adegbite, 2003; Fabunmi and Salawu, 2005; Odole and Akinpelu, 2009). It is the indigenous language of the Western part of Nigeria and has about 30 million speakers (Scotton, 1976; Fabunmi and Salawu, 2005). Awonusi (1993), further classified it as a Level 4 language due to its role as regional lingua franca and its use in network news around the country; it comes after the national language, which is English and Level 5. Levels 1 to 3 represent other minor languages, Edo, Efik, Fulfude, Idoma, Igala, Ijo, Kanuri, Nupe, Tiv and Pidgin English, which serve ethnic or sub-ethnic roles, ethnic languages used in network and restricted lingua franca, respectively (Fabunmi and Salawu, 2005).

Face validity and Content validity is the ability of a functional means to appear to measure the intended parameters and its ability to cover the necessary constructs, respectively (Streiner & Norman, 1995; Bowling, 1997). These would rely on how appropriate and easily understood the questions on the scale are to the patients and if the questions measure what

they are intended to measure. Emphasis is also placed on expert opinion on how appropriate the areas explored in the scale are.

Cognitive Debriefing Analysis aims at understanding how questions are processed and how information is remembered and structured to provide an answer (Harris-Kojetin et al., 1999). This technique is useful in the development of better questions in surveys and scales (Harris-Kojetin et al., 1999; Coates et al., 2006). The NDI has been shown to possess the ability to be successfully cross-culturally adapted (Cook et al., 2006; Mousavi et al., 2007; Aslan et al., 2008; Kyung-Jin et al., 2010). This study seeks to translate and cross-culturally adapt the NDI for use with Yoruba-speaking patients and to concurrently determine the face and content validity of the scale with the aid of cognitive interviews.

Methods

This study was designed as a translation and cross-cultural adaptation with cognitive testing. The NDI is a modified version of the Oswestry Disability Index produced by Vernon (2008) and is commonly used as a functional measure in neck pain (Macdermid et al., 2009). It consists of 10 items, which are scored from 0 to 5, that eventually come to represent the level of disability (Macdermid et al., 2009). The NDI has been shown to be a reliable and valid tool for functional measurement in its English and various language versions (Cook et al., 2006; Mousavi et al., 2007; Aslan et al., 2008; Kyung-Jin et al., 2010).

Procedure

Preparation: Approval for the study was obtained from the Ethical Review Committee at Sheffield Hallam University. Permission to translate the scale was also granted by the scale developer, after which the institutions to be involved in Nigeria were contacted and forwarded a copy of the research proposal for the approval to carry out the study on hospital property and engage service users. Contact details of persons to be involved in the study, for example, linguists, were then obtained.

Figure 1. Flow chart detailing process of translation and cross-cultural adaptation (Beaton et al.,2000).

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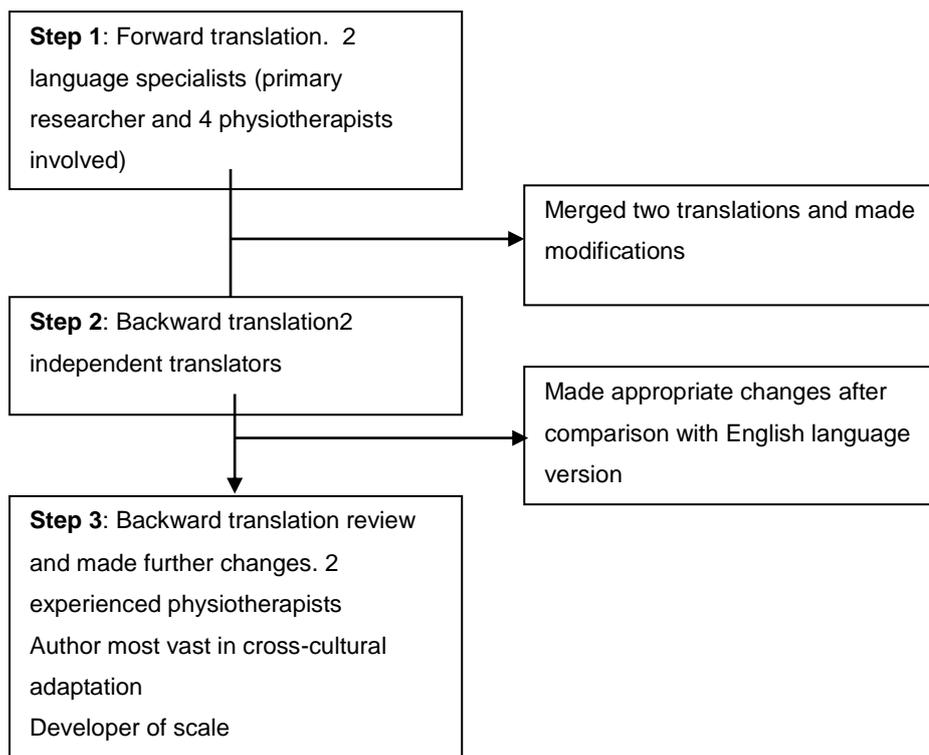
Forward Translation: The process of translating and cross-culturally adapting the NDI followed previous guidelines as reported by Beaton et al. (2000) and presented in Figure 1. A meeting was scheduled with two independent translators who were linguistics experts to discuss the need for conceptual rather than literal translation. A review of the process was carried out after consultation with four experienced physiotherapists with both academic and clinical backgrounds to ensure conceptual translation.

Reconciliation: This process involved the merging of the two independent forward translations by the primary researcher and the two previously mentioned translators at a scheduled meeting. Modifications were made.

Backward Translation: Two new and independent translators with no prior knowledge of the NDI or the forward translation process then translated the merged product back into the English language for comparison with the original NDI.

Backward Translation Review: The scale developer was sent copies of the backward translations and his opinion noted. Further modifications were made.

Table 1. Inclusion and Exclusion Criteria

Inclusion criteria (acute and chronic)	Exclusion criteria
- Non-specific neck pain - Whiplash-induced neck pain - Radiculopathy - Ability to understand, speak and read Yoruba fluently (Mousavi et al., 2007; Kyung-Jin et al., 2010)	- Severe cervical radiculopathy with bilateral symptoms - Myelopathy - Vertebral fracture - Cancer - Infectious diseases - Heart attack - Individuals with mental health problems or learning disabilities - Clinically recognisable cognitive impairment (Mousavi et al., 2007; Kyung-Jin et al., 2010)

Cognitive Debriefing: Participants who met the inclusion criteria (Table 1) were recruited using a convenience sampling method from the Physiotherapy Outpatient Unit at the Lagos State University Teaching Hospital. Four females and two males with non-specific neck pain and radiculopathy were recruited. Their ages ranged between 22 and 54yrs. Informed consent was sought before the process of interviewing commenced with each participant being aware of the right to withdraw at any time (Gil & Bob, 1999; Emmanuel, Wendler, and Grady et al. 2000). The primary researcher interviewed the participants in a private treatment room to ensure privacy after which code names were assigned to the participants. Files were kept under lock and key at a location known only to the primary researcher. Two cognitive interview approaches, which are the concurrent and recurrent approaches, were then employed through recorded structured interviews with the participants (Harris-Kojetin et al., 1999). The primary researcher was not previously known to the participants or *vice versa* to cancel out any Hawthorne effect (Adair, 1984). Details of the scripted probes employed are presented in Table 2.

Table 2. Scripted Probes used for Cognitive Interviews

Question 1	Example 1 (section 10: recreation)
Scripted Probe 1 (Concurrent Approach) (Harris-Kojetin et al., 1999)	"Please read the section out loud and verbalise your thoughts as you answer"
Scripted Probe 2 (Recurrent Approach) (Harris-Kojetin et al., 1999)	"Do you understand the section?"
Scripted Probe 3 (Recurrent Approach) (Harris-Kojetin et al., 1999)	"Please explain in your own words what you think is being asked of you in that section"

Finalisation: Transcripts of the interviews were then reviewed and common responses noted. Final modifications to the scale were made with final proofreading.

Results

Translation and Cross-cultural Adaptation

This process began after meetings between the authors, experienced physiotherapists with academic and clinical backgrounds, and the scale developer. Two out of ten constructs were modified from reading and driving to "sitting still" and "travelling in a vehicle", the former being a familiar phrase to the target population. Certain aspects were further modified, for example, hand washing of personal clothing was included to the section on personal care. The sections on work and recreation were also adapted to be inclusive of chores and general recreation and not just sporting activities, respectively. These adaptations were in pursuit of cultural validity (Bullinger et al., 1993; Corless, Nicholas, and Nokes, et al. 2001). Due to numerous meetings between the linguistics experts and the primary researcher, the forward translation process achieved conceptual equivalence with modifications made in the form of further simplification of words to suit a Junior Secondary School reading level (age: 12yrs) and correction of any discrepancies. The backward translation process involved further modifications, with the scale developer becoming more involved at this stage.

Cognitive Debriefing

The Yoruba version of the NDI was administered in its pre-final state to six patients with neck pain in a private treatment room at the Physiotherapy Outpatient Unit of the Lagos State University Teaching Hospital (LASUTH). The scale was adequately accepted and understood by the respondents who spoke different dialects of the Yoruba language. Final modifications were made, which included further adjustments to the section on recreation to aid in better understanding. Participants were encouraged to suggest appropriate wording where necessary. The time taken to fill the scale was, on average, 10 minutes, which was perceived to be a good indicator of how easily understood the Yoruba NDI was. Female respondents were more vocal during the interviews with elderly ones being more able to elaborate on their thought processes when compared with the male respondents. The scale was, however, generally understood.

Discussion

The translation and cross-cultural adaptation of health related quality of life measures before application to a particular group other than the population for which the original instrument was designed for, is essential to not only ensure that the instrument is understood by the target population, but to facilitate acceptance (Bullinger et al., 1993; Bullinger et al., 1998; Gandek & Ware, 1998; Corless, Nicholas, and Nokes, et al. 2001; Wild et al., 2005; Acquardo et al., 2008). This consequently was the aim of this study as it translated and cross-

culturally adapted the NDI for the Yoruba-speaking patient and then proceeded to test it for face and content validity with the Cognitive Debriefing Approach.

The Yoruba version of the NDI was accepted and understood by the study participants and, indeed, the experienced physiotherapists from varying backgrounds consulted during the course of the study, thereby suggesting face and content validity. This finding was also reported for the Dutch, Finnish, Turkish, Iranian, Korean and Brazilian versions of the NDI (Cook et al., 2006; Vos, Verhagen, and Koes, et al.2006; Mousavi et al., 2007; Aslan et al., 2008; Kyung-Jin et al., 2010; Salo, Ylinen, and Kautiainen, et al.2010). The main difference from the other language version studies, however, lies in the use of Cognitive Debriefing Analysis at this initial stage of scale development before further psychometric testing.

The cognitive interviews aimed to test, amongst other earlier mentioned properties, the cultural validity of the Yoruba version of the NDI by assessing the level of acceptance and understanding of the scale by the respondents. This was deemed necessary because the key to successfully cross-culturally adapting a reliable instrument lies not only in achieving conceptual equivalence but also on if the constructs explored are of any interest or are indeed relevant to the target population, as agreed upon by Herdman , Fox-Rushby, and Badia et al.(1997) and Corless, Nicholas, and Nokes et al., (2001). If indeed the respondents/participants can relate to the constructs, then there invariably would be a reduced incidence in omitted sections as reported in the Turkish and Dutch versions, where a number of patients did not drive (23.87% and 12.30%, respectively) and thus did not fill the driving section (Vos, Verhagen, and Koes,et al.2006; Aslan et al., 2008). Despite the authors of the Turkish version admitting that community transportation was commonly preferred in Turkey, no modifications were made. The Hindi version of the Neck Pain and Disability Scale as reported by Agarwal (2006), however, made modifications to include two-wheeled transport and rickshaws. Since there is an availability of more than two forms of transport in the target area, the use of travelling in a vehicle was deemed appropriate.

The limitations of this study lie in the sampling technique and relatively small sample size, which invariably would affect the transferable nature of its findings. However, the use of two cognitive interview approaches were employed to give credence to the outcome and further denote rigour since these approaches were used to aid the primary researcher to further ascertain that the eventual findings could be viewed as trustworthy. An example of this could be that a subject could appear to understand a piece of information but later proceed to describe something else in his/her words. The use of the Cognitive Debriefing Approach also aided the primary researcher in the compilation or development of a scale that now appears ready to undergo more rigorous psychometric testing since missing responses could affect the reliability of the scale as reported in the Brazilian version (Cook et al., 2006).

Nonetheless, these various versions demonstrated adequate validity and reliability leading one to wonder if the emphasis on more quantitative methods, as employed in the initial stages of the other language version studies, as opposed to the qualitative approach favoured in this study really makes a difference to the eventual outcome. This was explored by Coates et al. (2006) who eventually reported that both methods, when independently used, yielded similar results.

The quantitative approach during the initial stages of the other language version adaptations definitely resulted in better numbers than in this study, which impacted positively on their results and made their findings more generalizable to the wider population. However, important aspects like salience, cultural validity, cultural equivalence and cultural appropriateness of cross-culturally adapted measures are best determined by consultations with the target population (Corless, Nicholas, and Nokeset al.2001). Alternatively, can these

characteristics be ascertained without the involvement of the "scale users?" The answer could lie in the fact that both methods indeed have their merits and the development of a valid and reliable translated and cross-culturally adapted tool would benefit from the employment of both methods (Coates et al., 2006).

Translation and cross-cultural adaptation of an existing functional scale for use with a target population is a time-consuming and complex process that should be carried out with rigour to produce more conceptually valid, as well as culturally valid, tools (Herdman Fox-Rushby, Badia, et al.1997; Acquardo et al., 2008). The Beaton et al. (2000) protocol is commonly employed in most studies; however, the procedures employed afterward seem to slightly vary. Although the quality of studies have improved over the years, it is advisable to continue to standardize the protocols used, perhaps with a mixed method approach to ensure some uniformity in the process (Herdman, Fox-Rushby, Badia,et al.1997; Coates et al., 2006, Acquardo et al., 2008). This would ensure uniformity in the development of scales to aid in the collection of large data-sets as indicators of the performance of various adapted versions of already existing instruments. Further research into the use of a mixed method approach would also be of benefit to researchers involved in the process of translating and cross-culturally adapting quality of life measures.

Conclusion This study demonstrates that the Yoruba version of the NDI has undergone suitable translation and cross-cultural adaptation for the target population. Further psychometric testing is advised to further determine its validity and reliability.

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