Validity and test re-test reliability of the neck disability index in the Nigerian clinical setting

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Summary

The Neck Disability Index (NDI) is a valid and widely used clinical instrument, which enjoys the recommendation of the World Health Organization for outcome assessment in neck pain. Its psychometric properties have not been investigated in the Nigerian clinical setting. This study investigated the content validity and test- retest reliability of the NDI in order to encourage its integration in the Nigerian clinical setting. Content validity of NDI was assessed through an expert panel review for content relevance/ coverage and pre-testing. Thirty two subjects with neck pain, recruited through a purposive sampling technique participated in the study. The NDI was administered twice within 48 hours interval. Data were summarized in percentages. Intra class correlation coefficient was used to analyze data for test-retest reliability with alpha set at 0.05. Participants were 11 males, 21 females with a majority within age group 38-57. Twenty four (75%) participants had mild to moderate disability, 7 (21.9%) had severe to complete disability and one individual had no disability. There was a significant correlation (r=0.969, P=0.01) between the scores obtained from the first administration of the NDI and the second administration. The NDI is a valid and reliable outcome measure and it is recommended for integration into the assessment of neck pain in the Nigerian clinical setting.

Keywords: *Neck disability index, validation, reliability, disability, outcome measure, Nigeria*

Résumé

L'indice d'handicape du cou (NDI) est un instrument Clinique validé et intensément utilisé, suite a la recommandation de l'organisation mondiale d la santé après l'évaluation des résultats des douleurs du cou. Ses propriétés psychométriques n'ont pas été investiguées dans les pratiques cliniques Nigérianes.

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Cette étude évaluait la validité et le test de fiabilité du NDI dans le but d'encourage ses intégration en pratique cliniques. Trente deux sujets ayant les douleurs au cou, participaient dans cette étude. NDI était administré deux fois durant 48 heures d'intervalle. Les données étaient résumées en pourcentages. Le coefficient de corrélation entre les classe était utilise pour analyser les données du test de fiabilité avec alpha à 0.05. Les participants inclus 11 males et 21 femelles avec la majorité entre l'âge de 38-57 ans. Vingt quatre (75%) des participants avaient des handicapes légère à modéré, 7 (21.9%) avaient une handicape sévère a totale et un individu était normal. Il y avait une corrélation significative (r=0.969, P=0.01) entre les résultats obtenues de la première administration du NDI et de la seconde administration. Le NDI donne des résultats valables et fiables et est recommande pour l'intégration dans l'évaluation des douleurs au cou dans la pratique clinique Nigériane.

Introduction

Neck pain is a symptom not a disease condition, and it is usually impairment consequent to a disease condition [1]. It can be defined as pain around the cervical spine. Neck pain is a common problem in the general population [2,3], occurring at approximately 50 years of age and being more common in men than in women [4]. It is often accompanied by reduced range of motion and a feeling of stiffness and often precipitated or aggravated by neck movements or sustained neck posture. Headache, dizziness and other signs and symptoms may also be present in association with neck pain [5].

Health care professionals are being challenged to account for the effectiveness of their interventions by taking into account the outcomes that are important to the patient [6] hence the need for the development and validation of instruments to monitor the effects of their intervention. The impetus for the development of these outcome measures include changes in healthcare policies, the demands of the third party payers of health care and the recognition that people want to live, not just survive which has challenged health care providers

in developed countries to rigorously account for their interventions more than before [7]. Consequently, many outcome measures have been developed for different conditions in different populations [8,9]. Generally, there are varieties of measures in use; the choice of a particular instrument is hence a choice among options, though the instrument to be chosen must have proven psychometric properties [7]. However, instruments have been designed for specific purposes and for given populations hence locally standardized instruments are encouraged for use in the locality [10].

Neck pain poses significant psychosocial and physical burdens on individuals with the symptom [11] and many outcome measures have been developed for the assessment of the pain and its resultant functional limitations [10,12]. The Neck Disability Index [NDI] has been widely used in different populations to measure neck pain and disability [2, 13-17]. It is a pen and paper 10-item scale that assesses pain and disability originating from the neck [18]. It is a modified version of the Oswestry Low Back Pain questionnaire [19] and has proven evidence of psychometric properties in several populations. Currently, there are no published studies on the psychometric properties of the NDI in the Nigerian clinical setting; hence this study was aimed at assessing the content validity and test-retest reliability of the NDI in individuals with neck pain in the Nigerian clinical setting.

Materials and methods

Thirty-two patients with mechanical neck pain (pain around the cervical spine affected by movement of the neck pain and often accompanied by reduced range of motion, sustained neck posture), who were receiving treatment in the outpatient units of the Physiotherapy Department in University College Hospital (UCH), and Ring Road State Hospital, Ibadan participated in this study. They were individuals who could read and write in English language. The participants were recruited consecutively through a purposive sampling technique.

Ethical approval was sought and obtained from the University of Ibadan/University College Hospital Institutional Review Committee, before the study commenced. Permission was sought from the heads of the Physiotherapy departments of University College Hospital, Ibadan and Ring Road State Hospital, Ibadan, to carry out the study in the out-patient clinic. The content validity of the NDI was determined by an expert panel consisting of 5 individuals knowledgeable in the concept of instrument development. These individuals assessed the content of the NDI for items coverage and relevance. Written informed consent was sought and obtained from prospective subjects. The NDI was then pretested on 10 individuals with neck pain for clearness of language and comprehension. The 10 individuals were not involved in the final data collection. Socio-demographic data of age, sex, occupation, marital status and onset of neck pain were obtained from the subjects who participated in the reliability phase of the study.

Subjects who consented to take part in the study were given the NDI for self-administration. One of the authors waited while the questionnaire was being completed, offered explanations where necessary and collected the completed questionnaire. The questionnaire was re-administered on the patients 48 hours after the first administration. Socio-demographic characteristics of the participants were summarized using descriptive statistics of mean, standard deviation and percentages. Intra Class Correlation (ICC) coefficient was used to analyze data for test-retest reliability with alpha set at 0.05. Scoring on the NDI was through summing up points for all the 10 items while percentage disability was calculated using the formula:

$$\text{Disability in percentage} = \frac{\text{total score}}{50} \times 100$$

Results

All items on the NDI cover important domains relevant to an average Nigerian patient with neck pain based on the assessment of the expert panel.

Thirty two (11 males, 21 females) individuals with neck pain participated in this study with a majority (65%) of the participants within the age group 38-57. 75% of the participants were married, while 25% while single. 44% were university graduates were 9% had no formal education. Forty four percent of the participants were engaged in skilled occupation, six percent were retirees, thirteen percent were students, four individuals had no occupation. Twenty-four (24) (75%) of the participants had between mild to moderate disability while 7 (21.9%) had between severe to complete disability. One individual had no disability.

The mean NDI score at first administration was 40.4±18.7 while the mean score at second administration was 38.7±19.0. There was a significant correlation (r =0.969) between the scores obtained on the NDI when administered on two different occasions within 48 hours' interval. (Table)

Table 1: Test-retest reliability of neck disability index

	N	x	SD	r
1st administration	32	40.44	18.68	0.969
2nd administration	32	38.66	19.00	

Discussion

Condition specific instruments like the NDI are thought to be more sensitive to changes in symptoms and easier to integrate into clinical practice than generic instruments [20]. The NDI is a widely used instrument with evidence of adequate psychometric properties. In this present study, all items on the NDI were found to cover important dimensions relevant to an average Nigerian patient with neck pain. All the patients involved in the pretesting reported high comprehension of all the items on NDI. They reported no difficulty in clarity of the language and ease of understanding of all the items. This was probably because this study was limited to individuals who are literate in English Language while excluding those who were literate only in any of the Nigerian indigenous languages.

The hypothesis that there would be no significant correlation between the scores obtained on the NDI when administered on two different occasions within 48hours' interval was tested for the test re-test reliability of the NDI in the Nigerian environment. The high correlation between the NDI scores for the 1st administration and 2nd administration of the NDI indicated that there is a strong agreement between the two measurement values; hence the NDI is a reliable measure of disability in individuals with neck pain in the Nigerian environment. Correlation coefficients of 0.70 and above are considered to be high, correlations between 0.5-0.69 are considered moderate, while correlations below 0.50 are considered low [7].

The correlation coefficient of 0.96 obtained in this study is similar to the findings from previous studies on the reliability of NDI in different populations. Ackelman and Lindgren, assessed the validity and reliability of a modified version of the NDI in a Swedish population and reported a high reliability coefficient of 0.97 for test-retest reliability within 48 hours for the individuals with chronic neck pain [20]. Other studies have reported test-retest reliability values of 0.89[18], 0.68 [21], 0.64 [22] and 0.55 [23].

From the outcome of this study, it was concluded that the NDI is a valid (in terms of content) and reliable instrument for the assessment of neck pain. We recommend that it should be integrated into the assessment of Neck pain in the Nigerian clinical setting. Other studies could be conducted on translation of NDI into Nigerian indigenous languages in order to facilitate its utility in this environment.

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