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Assessment of pain and disability in patients with chronic neck pain: reliability and construct validity of the Turkish version of the neck pain and disability scale

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Abstract

Objectives: The objective of this study was to test whether a Turkish version of the Neck Pain and Disability Scale retains its reliability and validity of the original English version.
Methods: Sixty-one patients with chronic neck pain were enrolled in the study. The Neck Pain and Disability Scale (NPDS), the Pain Disability Index (PDI) and The Hospital Anxiety and Depression Scale (HADS) were filled by all subjects. Reliability was determined by internal consistency. Internal consistency was measured by calculating Cronbach's alpha and item-total correlation. Validity was examined by correlating the NPDS scores to the Visual Analogue Scale (VAS), PDI and HADS scores.
Results: Cronbach's alpha value for NPDS was found to be 0.86 and this was statistically significant ($p < 0.0001$). The item-total correlations of NPDS varied between 0.08 and 0.69. The cross-sectional construct validity coefficients were 0.51 for PDI, 0.45 for VAS, 0.35 and 0.33 for Hospital Anxiety and Depression Scales.
Conclusion: Despite its major limitations, our results seem to support previous findings of the English and French versions of the Neck Pain and Disability Scale, indicating that this functional scale is valid and reliable.

Introduction

Neck pain is one of the major complaints among the cervical spine disorders and the exact cause of the most mechanical neck pain remains elusive. It may include a broad spectrum of medical factors of physical, psychological and social nature.[1] Quantification of pain is necessary not only for the evaluation of current and future therapies, but also for assessing outcome measures of impairment and disability.[2] Questionnaires or functional measurements are now becoming more familiar to clinicians because of their ability to measure the impact of a disease on the performance of daily activities. Several accepted functional instruments, for example the Oswestry Disability Questionnaire,[3] the Pain Disability Index (PDI)[4] and the Sickness Impact Profile,[5] measuring generalized pain and related disability or functional status are in use, but they are not specifically developed for the patients with neck pain. Although measuring health status by generic questionnaires may also reflect the degree of disability, region-specific functional questionnaires measuring everyday activity limitations due to chronic neck pain are recommended.[6, 7] There are some valid and reliable functional scales, developed in English-speaking countries and then translated into another language for measuring specifically neck disorders: the Neck Disability Index (NDI),[6] the Neck Pain and Disability Scale (NPDS),[7] the Nortwich Park Neck Pain Questionnaire (NPQ).[8] NDI has been found to be a valid and reliable instrument to measure disability in French and Swedish versions.[9] NPDS has been also translated into French and was also reliable and valid for the assessment of pain and disability in

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neck disorders.[10] Moreover, it has been stated that the translated form of NPDS appeared to have the best construct validity among the other questionnaires specific to neck pain.[10]

Using a translated scale instead of creating a new scale, which is also a time-consuming process, may also allow a comparison of different populations.[11] On the other hand, translation of a scale brings about the complex problems of language, and the relationship between language and phenomenon of chronic pain, which mainly depends on many factors, including one's cognitive and behavioural factors, and personal perceptions and descriptions of pain that is mediated through language being used in the population. However, a translated form of region-specific functional scale in patients with chronic neck pain has never been tested within the Turkish population. Therefore, the first aim of the study was to investigate the reliability and construct validity of the Turkish version of NPDS in Turkish patients with chronic neck pain. Secondly the aim was to search for a possible correlation of disability with anxiety and depression to demonstrate the psychometric properties of the NPDS, since instruments designed to measure neck pain and related disability interfere with various activities of living and emotional distress.[12]

Material and methods

The study group consisted of 61 patients (7 men and 54 women) with chronic neck pain for at least 6 months who applied or referred to the outpatient clinics of the Physical Medicine and Rehabilitation Department, between January 2000 and December 2002. Patients were excluded if they had other major diseases causing disability, regional tumour or metastasis, vertebral fractures, a disc herniation requiring surgical treatment, a diagnosed psychiatric disorder or a diagnosed underlying disorder causing neck pain, whiplash and traumatic injuries, neck surgery within the previous 3 months and, if pregnancy was present. None of the patients were immigrants and patients who had not mastered the Turkish language sufficiently to complete the questionnaires by themselves were also excluded from the study.

All patients were interviewed and filled a brief form that described the patient's demographic and clinical characteristics. After completing physical examination, subjects were asked to complete the questionnaires to evaluate pain, disability and psychological status. All questionnaires were filled at the hospital under the supervision of the two investigators. Pain was evaluated by Visual Analogue Scale (VAS).[13] Disability was assessed by NPDS and PDI. NPDS is a 20-item questionnaire developed by using the Million Visual Analogue Scale as a template.[14] The items explore pain intensity; its interference with vocational, recreational, social, and functional aspects of living, and as well as the presence and extent of associated emotional factors. Each item has a 10-cm visual analogue scale. It has six major divisions divided in equal intervals by vertical bars. Midpoints for each interval are marked with two dots (half a point on a vertical slash). Scoring of each item varies along a continuous scale from 0 to 5. The original version of the NPDS was translated into Turkish by a professional bilingual translator team including one translator whose native language was English and three investigators were involved in this process. The translation was not a 2-step translation procedure. PDI is a short, self report instrument which measures the degree to which pain presently interferes with living activities.[4, 15, 16] The Hospital Anxiety and Depression Scale (HADS) has been developed and found to be a valid and reliable instrument in detecting states of depression and anxiety and also valid to measure severity of emotional disorders.[17] The scale ranges from no symptoms (0) to maximum of distress.[21]

All statistical analyses were performed using the SPSS version 9.05 for Windows computer software package.[17] A level of $p < 0.05$ was considered statistically significant. Reliability was evaluated by measuring internal consistency. Internal consistency was measured by calculating Cronbach's alpha (value exceeding 0.7 was considered indicative of acceptable internal consistency) and the item-total correlation. Item-total correlation of NPDS was calculated by Pearson's correlation coefficient. Correlations of 0.20 or more were considered to indicate good internal consistency. NPDS score was correlated with VAS, PDI and HADS scores to obtain coefficients for cross-sectional construct validity.

Results

The mean and standard deviation of age and duration of pain of the study group was 43.03 ± 9.14 and 5.19 ± 4.87 years, respectively. Means and standard deviations of the scales were as followings; 38.15 ± 16.55 for NPDS score 17.01 ± 12.44 for PDI score, 5.98 ± 1.35 for VAS score, 7.42 ± 4.06 for HAD-depression and 9.77 ± 4.66 for HAD-anxiety scores. Categorical variables of the patients are presented in table 1.

Acceptability of the NPDS was satisfactory, with a completion time of 15–20 min for NPDS. None of the

Table 1 Summary of categorical variables ($n = 61$)

Variables	*Category*	*Number*	*%*
Gender	Male	7	11.5
	Female	54	88.5
Education	Elementary	26	42.6
	High School	22	36.1
	University	13	21.3
Diagnosis by physician	Neck strain/myofacial	31	50.8
	Herniated/degenerated disk	20	32.8
	Osteoarthritis	10	16.4
Occupation	Working in office	16	26.2
	Housewife	30	49.2
	Retired	13	21.3
	Other	2	3.3
Socioeconomic status	Low	19	31.1
	Middle	31	50.8
	High	11	18.0
Smoking Habit	Smoker	20	32.8
	Non-smoker	38	62.3
	Ex-smoker	3	4.9
Alcohol Use	User	5	8.2
	Non user	56	91.8
Previous neck surgery*	Yes	4	6.7
	No	56	93.3
Sedentary life style	Yes	48	78.7
	No	13	21.3

*The total number of subjects is less than 61 due to a missing value.

items was excluded, even though item 7 (driving) and item 10 (working activities) in NPDS were the least responded items (19.6%, 27.8%, respectively). However, there were few major problems about filling the NPDS. Subjects did not understand how to mark the subdivided VAS in the NPDS questionnaire and, as the concept of recreational and social activities have somewhat different meanings in Turkey than in western countries, patients were confused about how to give responses on those questions involving recreational and social activities. At that time, the investigators were contacted and examples with details were given to help the subjects to make their choices.

Cronbach's alpha values for NPDS were found to be 0.86 and this was statistically significant ($p < 0.001$). The item-total correlations of NPDS varied between 0.08 and 0.69 (table 2). Item number 7 (driving) was the only correlation which showed no statistical significance ($p > 0.05$). The correlation coefficients between the NPDS and PDI sum scores, and the NPDS and the VAS score were 0.51 and 0.45, respectively. Strong correlations were found between the NPDS and VAS score, and between the NPDS and PDI sum score ($p < 0.001$). The correlations between the NPDS and HAD-depression sum score (0.35), and the NPDS and HAD-anxiety sum score were moderate (0.33), yet statistically significant ($p < 0.05$).

Table 2 Item-Total Correlation (ITC) *Correlations between each item on the Neck Pain and Disability Scale (NPDS) and the sum score of the NPDS

Items	*ITC*	p *value*
Current pain	0.580	< 0.001
Pain on the average	0.511	< 0.001
Pain at worst	0.493	< 0.001
Pain interfering with sleep	0.473	< 0.001
Pain with standing	0.557	< 0.001
Pain with walking	0.694	< 0.001
Pain interfering with driving	0.083	> 0.05
Pain interfering with social activities	0.551	< 0.001
Pain interfering with recreational activities	0.515	< 0.001
Pain interfering with work activities	0.451	< 0.001
Pain interfering with personal care	0.692	< 0.001
Pain interfering with personal relationship	0.454	< 0.001
Pain effecting the personal outlook on life and future	0.694	< 0.001
Pain effects on emotions	0.628	< 0.001
Pain effecting the ability to think and concentrate	0.624	< 0.001
Stiffness of the neck	0.622	< 0.001
Difficulty on turning the neck	0.571	< 0.001
Difficulty on looking up or down	0.635	< 0.001
Difficulty on working overhead	0.542	< 0.001
Pain relief with pills	0.585	< 0.001

*Derived by Pearson's correlation coefficients.

Discussion

In our study, in which the reliability and validity of the Turkish version of the NPDS were assessed, our results showed that the reliability of the scale, as indicated by

internal consistency and item-total correlation proved to be high as did the cross-sectional construct validity. However, there are some limitations of our study. The absence of a control group and cross-sectional design, and the long time span of the study may limit the reliability of the clinical measurements. Another limitation of the study is that; because of the very limited number of male patients, conclusions can only be made to female patients. Finally, patients' confusion in understanding the concept of recreational and social activities that can be related to the use of inappropriate translation procedure may limit the generalizability of our findings.

Psychological variables are also important in the onset and development of neck pain problems and depression, anxiety, distress and related emotions are related to long-term pain and disability.[12, 18–20] Therefore, instruments measuring functional status should also reflect their psychometric properties. Few studies have been conducted by using NPDS since its original publication in terms of providing psychometric data.[10] In the original publication,[7] NPDS was found to be correlated with psychological measures of depression and neuroticism. It is also stated that the strong correlation between the Beck Depression Index and NPDS confirmed the association between depression, pain and disability. This may indicate that the NPDS is an emotionally receptive measure. Our findings were consistent with previous reports.

In conclusion, although it is difficult to draw definite conclusions due to major limitations of the study, the findings concerning the Turkish version of the NPDS seem to support results from earlier studies where the NPDS has been established as reliable and a valid instrument in chronic neck pain patients. However, further reliability and validity studies with larger heterogenic groups, using the appropriate translation procedure are essential in adapting the scale to the Turkish population.

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