Spanish version of the Northwick Park Neck Pain Questionnaire: Reliability and validity

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Abstract

Objective

To validate a Spanish version of the Northwick Park Neck Pain Questionnaire (NPQ) and to prove its usefulness in clinical practice.

Methods

We studied 58 patients with non-inflammatory neck pain of more than 4 months duration. A blind back translation of the NPQ was made, and the resulting back-translation version was then compared with the original. The NPQ comprises 9 questions with 5 statements of increasing difficulty. Patients completed the questionnaire 3 times: on their initial assessment; 8-10 days later (test-retest); and after physiotherapy treatment 3 months later. Neck pain was assessed by a visual analogue scale (VAS).

Results

Fifty-three patients completed the questionnaire (90%). There was a good intra-class correlation between the test-retest NPQ ($r = 0.63$), indicating good agreement. For each of the 9 sections, agreement ranged from $r = 0.43$ to $r = 0.85$, $p < 0.05$ in all cases. Correlation with the VAS was also good, between $r = 0.51$ (test) and $r = 0.74$ (retest) ($p < 0.05$ in all cases). Pain measured by the VAS increased according to the NPQ score, grouped by percentages ($p = 0.003$). The mean scores for each section increased with that of the intensity of pain, in most sections showing good internal consistency. Pain and the NPQ score improved after treatment (56.1 ± 20.2 to 29.9 ± 20.1, $p = 0.0001$ and $45.9\% \pm 12.7\%$ to $28.9\% \pm 15.3\%$, $p = 0.0001$ respectively), as did all the other items except for driving ($p < 0.05$).

Conclusions

The Spanish version of the NPQ is a feasible, reliable and valid instrument to measure pain in Spanish-speaking patients with chronic neck pain.

Key words

Neck pain, Northwick Park Neck Pain Questionnaire, validity, transcultural equivalency.

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Introduction

Non-specific neck pain is very common in rheumatology patients (1-3). Of the working population, 30% aged 25-29 years and 50% over 45 years report one or more attacks of painful neck, which is the primary motive for patient presentations (4-6). Symptoms are relevant whilst signs are scarce and may be limited to local tenderness or a reduced range of movement. Pain can be assessed by different instruments such as visual analog scales (VAS), numerical rating scales, or verbal rating scales, with no substantial differences between these methods in comparative studies (7).

A completely different approach is the Northwick Park Neck Pain Questionnaire (NPQ) (1), developed to assess the level of disabilities due to neck pain, concentrating on self-reported subjective feelings and reductions in daily neck pain, evaluated with standard clinical techniques and taking advantage of activities frequently engaged in by patients. The NPQ was created to overcome the difficulties presented by questionnaires, taking into account past experience with the assessment of low back pain with this type of instrument (8). The NPQ has proved to be a useful tool in studies of neck pain, correlating with objective measurements such as range of movement of the neck and semi-objective parameters such as the VAS (4). This paper presents the validation of the NPQ for the Spanish speaking population.

Patients and methods

Patients

The validation of this questionnaire formed part of a study comparing the effectiveness of 2 types of physiotherapy treatment: classic physiotherapy which includes hot packs, massage, ultrasound and manual traction versus manipulative treatment. The population studied was composed of 58 patients with neck pain of more than 4 months duration. None had previous neck surgery performed or any objective neurologic deficits, malignancies, or inflammatory arthritis. Patients were evaluated clinically to determine the onset and course of the neck pain, the severity, duration and characteristics of the symptoms, and previous or current treatment, as well as range of motion of the cervical spine. Moreover, all patients had laboratory and radiological assessments. The pain was also assessed by VAS.

Questionnaire

The NPQ (1) is a self-administered questionnaire which includes 9 sections on daily activities that may be affected by neck pain:intensity, sleeping, numbness, duration, carrying, reading/television, work, social and driving. Each section contains 1 question and 5 statements as possible answers, each with increasing difficulty or pain. The patient is asked to pick the one statement that most closely describes their current situation.

Each section is scored on a 0-4 scale, 4 representing the greatest disability, and the total score is obtained by summing the scores for the 9 sections (possible score: 0-36). Finally, a percentage is calculated by dividing the patient's score by the maximum possible, depending on the number of sections answered. If all 9 sections are completed the NPQ percentage score is calculated as: (total scored/36) x 100%. If one section has not been answered, the score is calculated as: (total score/32) x 100%. Questionnaires are not valid if sections are incorrectly completed or more than one is omitted.

Section 10 evaluates the patient's assessment of changes in pain after follow up and is not included in the NPQ final score.

The semantic equivalence of the Spanish version with the original was evaluated by means of a blind back-translation and the resulting back-translated version was then compared with the original. There were no appreciable differences with the original, and the Spanish version was considered to be acceptable.

Methods

Patients completed the questionnaire 3 times over a period of 3 months: on their initial assessment (test); between 8-10 days later (retest); and after 3 months (at the end of the physiotherapy

treatment). Each assessment was performed without knowing the results of the previous visit.

Statistical methods

The feasibility of the NPQ was evaluated by calculating the proportion of patients able to self-administer the questionnaire and the time taken to complete it. Test-retest reliability was assessed using the intra-class correlation coefficient in the total score and within each section. Construct validity was assessed by comparing both the total NPQ score and the mean scores for each section with the neck pain (VAS) by Pearson's and Sperman's correlation coefficient, respectively. Differences after treatment were assessed by the paired t-test. The longitudinal construct validity was calculated by comparing the difference between the initial and final NPQ scores with the patient rating of improvement of pain after treatment by Pearson correlation coefficient. Finally an analysis of variance was performed between the changes in the NPQ score and overall improvement after treatment, after regrouping responses to the 10th question in 3 groups; improvement, no change and worsening.

Results

A total of 58 patients (48 women and 10 men) with mechanical neck pain entered the study. The mean age ± SD of the patients was 55 ± 13.2 years (range 22-77). The mean duration of disease was 10 ± 8.5 years. The neck pain was continuous in 8 patients (13.7%) and recurrent in 47 (81%). Pain irradiated to the shoulders in 38 patients (65.5%). The mean educational level of the patients was 6.7 ± 4.3 years (range 4-17). In all patients standard analytical studies including the erythrocyte sedimentation rate, hematology and C-reactive protein were normal. Radiological results were: 4 patients had normal cervical spine radiographs, 14 had reversal of their cervical lordosis, 20 had degenerative changes, and 16 had both findings.

Feasibility. Fifty-three out of 58 (90%) patients with mechanical neck pain recruited completed the self-administered questionnaire. All patients needed less than 10 minutes to do so. None of the sections presented difficulties except for section 9 (driving), which was only answered by 20 patients (38%).

Short term reliability. Reliability measured by the intra-class correlation coefficient was found between the scores of the first and second NPQ (ICC = 0.63) (Table I). For each of the 9 sections, agreement ranged from ICC = 0.42 to ICC = 0.85 (Table I).

Construct validity. The correlation between pain (VAS) and the NPQ score was acceptable in the test (r = 0.51; p = 0.0001), retest (r = 0.74; p = 0.0001) and after treatment (r = 0.60; p = 0.0001). We also divided the patients into 4 groups based on their final NPQ score: 0-24% (group 1), 25-49% (group 2), 50-74% (group 3), and 75-100% (group 4). No patient had a score higher than 75%, so only 3 groups were considered. Pain measured by the VAS rose according to the NPQ group (F = 0.003) (Table II).

To check for internal consistency, the mean scores for each section were compared with the intensity of neck pain reflected in the first question of the NPQ. The mean scores for each section rose with the intensity of pain as reflected in the first section of the questionnaire, but some discrepancies were found in numbness, carrying and work (Table III).

Longitudinal construct validity. After

Table I. Test-retest reliability between total score of NPQ and individual sections measured by the intra-class correlation coefficient (ICC).

	ICC	95% Confidence interval	
Total score	0.63	0.44	0.76
Pain intensity	0.46	0.22	0.65
Sleeping	0.66	0.48	0.79
Numbness	0.59	0.38	0.74
Duration	0.42	0.17	0.62
Carrying	0.62	0.43	0.76
Reading/television	0.57	0.35	0.72
Work	0.54	0.31	0.70
Social activities	0.65	0.46	0.78
Driving	0.85	0.65	0.94

Table II. Mean and standard deviation (SD) of pain in NPQ groups, grouped by percentage scores.

NPQ	No.	Pain (VAS)	SD
Group 1 0-24%	5	34.6	26.1
Group 2 25-49%	31	50.8	18.5
Group 3 50-74%	21	64.8	18.1

Table III. Mean and standard deviation scores of sections 2 to 9 of the NPQ, grouped by the global pain intensity as measured in section 1 (see Appendix II). Only 4 groups are shown as no patient chose the 5th option.

Sections	Group 0 (No pain)	Group 1 (Mild pain)	Group 2 (Moderate pain)	Group 3 (Severe pain)
2. Sleeping	1 ± 1	1.5 ± 0.9	1.6 ± 0.7	1.9 ± 0.9
3. Numbness	1.3 ± 0.5	1 ± 1.1	1.1 ± 0.7	1.8 ± 0.9
4. Duration	1.3 ± 0.5	2 ± 1.1	2.6 ± 1.2	3.6 ± 0.7
5. Carrying	2.3 ± 0.5	1.4 ± 0.9	1.8 ± 0.9	2.5 ± 1
6. Reading	1.3 ± 0.5	1.6 ± 0.7	2.1 ± 0.9	2.7 ± 0.5
7. Work	1.3 ± 0.5	1.1 ± 0.5	1.3 ± 0.6	1.9 ± 0.9
8. Social activities	0.6 ± 0.5	0.6 ± 0.7	1 ± 0.6	1.6 ± 1.1
9. Driving	0	1	1.2 ± 0.8	1.5 ± 0.7
Total score	16 ± 10.2	32.5 ± 12.4	42.4 ± 10.6	56.6 ± 10.7

Table IV. Differences after treatment in the pain scale and NPQ score.

	Before treatment	After treatment	P
Pain scale (VAS)	56.1 ± 20.5	29.9 ± 20.1	0.0001
NPQ score (%)	45.9 ± 12.7	28.9 ± 15.3	0.0001

Table V. Differences after treatment in sections included in NPQ questionnaire.

	Before treatment	After treatment	P
Pain intensity	2.1 ± 0.6	1.2 ± 0.8	0.0001
Sleeping	1.6 ± 0.8	0.9 ± 0.8	0.0001
Numbness	1.3 ± 0.9	0.9 ± 0.8	0.004
Duration	2.9 ± 1.1	1.7 ± 1.1	0.0001
Carrying	1.9 ± 0.9	1.5 ± 0.9	0.004
Reading	2.1 ± 0.9	1.6 ± 0.7	0.001
Work	1.4 ± 0.7	1.0 ± 0.6	0.001
Social activities	1.2 ± 0.8	0.6 ± 0.8	0.0001
Driving	1.2 ± 0.7	0.8 ± 0.8	0.1

Table VI. Mean NPQ (NPQ1-NPQ2) change in score depending on the overall improvement or worsening after treatment.

	n	Mean (%)	SD
Better	47	17	13
Same	1	9	
Worse	4	- 2	5

treatment, patients improved both in the pain scale and NPQ scores, as shown in Table IV. All sections within the questionnaire except for driving improved, probably due to the small number of patients who answered that section (Table V). We analyzed the differences in the NPQ scores after treatment after dividing the patients into 3 groups: better, same and worse. Most patients improved (n = 47), 1 remained the same and 4 got worse. There were differences in the NPQ score within these groups (F = 0.01) (Table VI).

Discussion

Our study shows that the Spanish version of the NPQ is a feasible, reliable and valid instrument, which can be used to assess neck pain in clinical practice. Grading idiopathic neck pain provides a useful instrument to help in treatment decisions, prognostic evaluations and medical assessments.

Chronic neck pain is highly prevalent and a common source of disability in the working age population (9-11). Some authors have reported that two-thirds of the population experience neck pain at some point in their life (3). It is costly in terms of treatment, individual suffering and time lost from work. Whatever the origin of the pain, objective assessment is difficult and evaluation must principally rely on the patient's subjective experience of pain and disability (1). The measurement of these variables provides a way to follow the course of the patients, as well as the effects of therapy (12, 13).

Questionnaires designed for completion by the patient are increasingly used as a convenient and reproducible measure of subjective symptomatology in the field of low back pain (8, 14, 15). Few data exit to support the use of functional status measures on patients with disorders of the cervical spine (1, 16, 17). Vernon and Mior (17) examined the measurement properties of the Neck Disability Index (NDI), a region-specific functional status questionnaire designed for patients with neck problems. The NDI is based on the Oswestry Low Back Pain Disability Questionnaire, a region-specific questionnaire developed for use in patients with low back pain (8). The final form of the NDI consists of 5 items that were derived from the Oswestry questionnaire and 5 items identified from feedback from the practitioners, the patients, and a review of the literature. Several issues appear to limit the content validity of the NDI. Only patients with whiplash injuries reviewed the items, and the literature used to develop the NDI dealt only with whiplash injuries. Whether the content of the NDI is valid for patients with neck complaints unrelated to whiplash injuries is unclear.

The NPQ is a questionnaire adapted from the Oswestry Low Back Pain Disability Questionnaire (1). It is a simple test to evaluate neck pain and its resultant disability and it gives us a percentage score of the patient's level of functioning. Most patients found it easy to complete and its short-term repeatability and long-term sensitivity to change have been demonstrated (1). We found problems only with section 9 - driving, as more than 50% of the patients either did not know how to drive or were unable to drive due to advanced age.

Although most of the existing health-related quality of life measures have been developed and tested in English-speaking cultures, they are widely used in different countries and in non-English-speaking cultures (18, 19). Guillemin *et al.* (20) have proposed guidelines for the cross-cultural adaptation of health-related quality of life measures. These guidelines include recommendations for obtaining semantic, idiomatic and conceptual equivalence in the translation by using back-translation techniques and committee review. In our study the back-translation approach was used. All items could be translated into Spanish without difficulty. No question or word had a doubtful translation. We believe that the questions in the original and adapted versions have similar meanings.

The test-retest reliability found for the adapted version was good, but slightly less than that found by others authors when validating other questionnaires (1, 19, 21). Significant improvements in pain and the NPQ score were seen after 3 months in those who had received physiotherapy, suggesting that the NPQ will prove helpful in future objective studies designed to assess therapies for patients with neck pain.

In conclusion, our study suggests that the Spanish version of the disability scale of NPQ is culturally equivalent to the original questionnaire, and is a feasible, reliable and valid instrument to measure outcome in patients with neck pain.

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Appendix I. Cuestionario de dolor cervical.

Este cuestionario va dirigido a conocer como puede afectar el dolor cervical a su vida diaria. Por favor, conteste cada pregunta marcando con una X, una sola alternativa.

1. - Intensidad del dolor cervical
   - No tengo dolor en este momento
   - El dolor es leve en este momento
   - El dolor es moderado en este momento
   - El dolor es severo en este momento
   - El dolor es el peor imaginable en este momento

2. - Dolor cervical y sueño
   - El dolor no me altera el sueño
   - El dolor ocasionalmente me altera el sueño
   - El dolor regularmente me altera el sueño
   - Duermo menos de 5 horas diarias a causa del dolor
   - Duermo menos de 2 horas diarias a causa del dolor

3. - Pinchazos u hormigueos en los brazos por la noche
   - No tengo pinchazos u hormigueos por la noche
   - Ocasionalmente tengo pinchazos u hormigueos por la noche
   - Mi sueño es habitualmente alterado por pinchazos u hormigueos
   - A causa de los pinchazos u hormigueos duermo menos de 5 horas diarias
   - A causa de los pinchazos u hormigueos duermo menos de 2 horas diarias

4. - Duración de los síntomas
   - Mi cuello y brazos los siento normales durante todo el día
   - Tengo síntomas en el cuello y brazos cuando me despierto y me duran menos de 1 hora
   - Tengo síntomas de forma intermitente durante un tiempo al día de 1-4 horas
   - Tengo síntomas de forma intermitente durante un tiempo al día mayor de 4 horas
   - Tengo síntomas continuamente todo el día

5. - Coger pesos
   - Puedo coger objetos pesados sin que me aumente el dolor
   - Puedo coger objetos pesados, pero me aumenta el dolor
   - El dolor me impide coger objetos pesados, pero puedo coger objetos de peso medio
   - Solo puedo levantar objetos de poco peso
   - No puedo levantar ningún peso

6. - Leer y ver la T.V.
   - Puedo hacerlo tanto tiempo como quiero
   - Puedo hacerlo tanto tiempo como quiero, si estoy en una postura cómoda
   - Puedo hacerlo tanto tiempo como quiero, pero me produce aumento del dolor
   - El dolor me obliga a dejar de hacerlo m·s pronto de lo que me gustaría
   - El dolor me impide hacerlo

7. - Trabajo
   - Puedo hacer mi trabajo habitual sin que aumente el dolor
   - Puedo hacer mi trabajo habitual, pero me aumenta el dolor
   - Tengo que reducir mi tiempo de trabajo habitual a la mitad por el dolor
   - Tengo que reducir mi tiempo de trabajo habitual a la cuarta parte por el dolor
   - El dolor me impide trabajar

8. - Actividades sociales.
   - Mi vida social es normal y no me produce aumento del dolor
   - Mi vida social es normal, pero me aumenta el grado de dolor
   - El dolor ha limitado mi vida social, pero todavÌa soy capaz de salir de casa
   - El dolor ha limitado mi vida social ha permanecer en casa
   - No tengo vida social a causa del dolor

9. - Conducir
   - Puedo conducir sin molestias
   - Puedo conducir, pero con molestias
   - El dolor cervical o la rigidez me limita conducir ocasionalmente
   - El dolor cervical o la rigidez me limita conducir frecuentemente
   - No puedo conducir debido a los síntomas en el cuello

10.- Comparado con la última vez que contestó este cuestionario, su dolor de cuello está:
   - Mucho mejor
   - Algo mejor
   - Igual
   - Algo peor
   - Mucho peor

Appendix II: Neck pain questionnaire.

Please read: This questionnaire has been designed to give us information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the one box which applies to you. We realise you may consider that two of the statements in any one section relates to you, but please just mark the box which most closely describes your problem. Remember, just mark one box in each section.

1. Neck pain intensity
   - I have no pain at the moment
   - The pain is mild at the moment
   - The pain is moderate at the moment
   - The pain is severe at the moment
   - The pain is the worst imaginable at the moment

2. Neck pain and sleeping
   - My sleep is never disturbed by pain
   - My sleep is occasionally disturbed by pain
   - My sleep is regularly disturbed by pain
   - Because of pain I have less than 5 hours sleep in total
   - Because of pain I have less than 2 hours sleep in total

3. Pins and needles or numbness in the arms at night
   - I have no pins and needles or numbness at night
   - I have occasional pins and needles or numbness at night
   - My sleep is regularly disturbed by pins and needles or numbness
   - Because of pins and needles I have less than 5 hours sleep in total
   - Because of pins and needles or numbness I have less than 2 hours sleep in total

4. Duration of symptoms
   - My neck and arms feel normal all day
   - I have symptoms in my neck or arms on waking, which last less than 1 hour
   - Symptoms are present on and off for a total period of 1-4 hours
   - Symptoms are present on and off for a total of more than 4 hours
   - Symptoms are present continuously all day

5. Carrying
   - I can carry heavy objects without extra pain
   - I can carry heavy objects, but they give me extra pain
   - Pain prevents me from carrying heavy objects, but I can manage medium weight objects
   - I can only lift light weight objects
   - I cannot lift anything at all

6. Reading and watching T.V.
   - I can do this as long as I wish with no problems
   - I can do this as long as I wish, if I am in a suitable position
   - I can do this as long as I wish, but it causes extra pain
   - Pain causes me to stop doing this sooner than I would like
   - Pain prevents me from doing this at all

7. Working/Housework etc.
   - I can do my usual work without extra pain
   - I can do my usual work, but it gives me extra pain
   - Pain prevents me from doing my usual work for more than half the usual time
   - Pain prevents me from doing my usual work for more than a quarter the usual time
   - Pain prevents me from working at all

8. Social activities
   - My social life is normal and causes me no extra pain
   - My social life is normal, but increases the degree of pain
   - Pain has restricted my social life, but I am still able to go out
   - Pain has restricted my social life to the home
   - I have no social life because of pain

9. Driving (omit 9 if you never drive a car when in good health)
   - I can drive whenever necessary without discomfort
   - I can drive whenever necessary, but with discomfort
   - Neck pain or stiffness limits my driving occasionally
   - Neck pain or stiffness limits my driving frequently
   - I cannot drive at all due to neck symptoms

10. Compared with the last time you answered this questionnaire, is your neck pain:
   - Much better
   - Slightly better
   - The same
   - Slightly worse
   - Much worse