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The Reliability and Validity of the Greek Version of the Northwick Park Neck Pain Questionnaire: A Study in Patients with Upper Trapezius Myofascial Trigger Points

Η Αξιοπιστία και Εγκυρότητα της Ελληνικής Έκδοσης του Ερωτηματολογίου Northwick Park Neck Pain: Μελέτη Εφαρμογής σε Ασθενείς με Σημεία Πυροδότησης Πόνου του Άνω Τραπεζοειδούς Μυός

Περίληψη στο τέλος του άρθρου

Panagiotis Rentzias,[1] Dimitrios Stasinopoulos[2]

[1]*Clinical Trainer of Physiotherapy, Department of Health Sciences, School of Sciences, European University Cyprus, Cyprus*
[2]*Assistant Professor of Physiotherapy, Department of Physiotherapy, University of West Attica, Member of Laboratory of Neuromuscular & Cardiovascular Study of Motion (LANECASM), Egaleo, Athens, Greece*

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Corresponding author:
Panagiotis Rentzias
European University Cyprus
Department of Health Sciences
6 Diogenis street, 2404 Engomi,
P.O. Box: 22006, 1516 Nicosia-Cyprus
Tel: (+35) 722 559 565
e-mail: p.rentzias@external.euc.ac.cy

Introduction: Myofascial trigger points are a musculoskeletal problem that affect a patient's life. The main symptoms of this common situation are pain, disability, and decrease range of motion of the cervical spine. Many authorities use the Northwick Park Neck Pain Questionnaire to measure the disability caused by trigger points of the upper trapezius muscle. Prior to this study, there was no valid and reliable Greek version of the Northwick Park Neck Pain Questionnaire available. **Aim:** The purpose of this study was to evaluate the reliability and validity of an adapted Greek version of the Northwick Park Neck Pain Questionnaire. **Material and Method:** Following the usual steps for cross-cultural adaptation, the validated Northwick Park Neck Pain Questionnaire was administered to 96 patients who were suffering from trigger points in the upper trapezius muscle. All of them completed the questionnaire a second time within 24 hours. Statistical analysis included measurement of internal consistency with Cronbach's α coefficient and reliability with intraclass correlation coefficient to estimate the rank order agreement between the test and the retest questionnaire answers. Also, construct validity was investigated with factor analysis. **Results:** After results analysis, a Cronbach's α coefficient of 0.926 for the total score was found. Test–retest reliability with intraclass correlation coefficient ranged from 0.933 to 0.970, exhibiting acceptable stability. Construct validity evaluated by factor analysis showed an eigenvalue of 76.745 of total variance, while the factors loading ranged from 0.430 to 0.963. **Conclusions:** It is concluded that the adapted Greek version of the Northwick Park Neck Pain Questionnaire is valid and reli-

able and can be used for Greek-speaking patients with active myofascial trigger points of the upper trapezius muscle.

Key-words: *Neck Pain Questionnaire, validity, internal consistency, neck pain.*

Introduction

Myofascial pain syndrome is a common source of musculoskeletal pain in primary care. About 30% of patients who visit health care clinics because of pain meet the criteria for myofascial pain syndrome. Myofascial pain syndrome is usually observed at muscle tendon units that are under continuous eccentric loading. This syndrome is characterized by trigger points, which are hyperirritable spots in muscle bellies and are associated with pain referral patterns.[1,2]

A myofascial trigger point (MTrP) is defined as a highly localized and hyperirritable spot in a palpable taut band of skeletal muscle fibers. Evidence indicates that myofascial pain caused by MTrP can affect a lot of people. Patients suffering from myofascial pain syndrome can manifest many clinical symptoms such as muscle spasm by trigger points, referred pain, hyperirritable nodule of spot tenderness, and pain.[1,2]

The trapezius muscle, and specifically its upper part, is usually found to be symptomatic and many times generates pain, which is due to trigger points, also because of some muscle imbalance syndromes such as the upper crossed syndrome. This muscle is most often surrounded by trigger points affecting the neck region by decreasing the range of motion, increasing pain and patients' other symptoms. Pain can be determined using different instruments such as verbal rating scales, visual analog scales, and numerical rating scales, with no essential differences between these methods evidenced in relative studies.[3,4]

The Northwick Park Neck Pain Questionnaire (NPQ) was developed by Leak et al.[5] to determine the level of disorders due to neck pain and gives information such as how neck pain has affected the patient's ability to manage in everyday life. This questionnaire was designed to overcome the shortcomings of related scales, considering past experience with the importance attached to determining low back pain with this kind of questionnaire. 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 visual analog scale. Over time, the NPQ has been translated into many other languages.[6–13]

The aim of the present study was to describe the validation of the NPQ for the Greek-speaking population.

Material and Method

Study population

The sample that took part in order to determine the reliability of the algorithm's indications was initially used to determine the reliability and validation of a correct Greek language adaptation of the Northwick Park NPQ. These 289 people were gathered from the relevant publication and the questionnaire was administered randomly. In line with Anthoine et al[14] and Tsang et al,[15] regarding the validation and reliability of translation of questionnaires, the sample size selection was made according the number of questions. In the case of the Northwick Park NPQ, there are 10 questions. Therefore, at a ratio of between 5 and 10 per question, any sample size between 50 and 100 is a valid number.[16]

A number of the 289 people were interested in participating in this study, from whom a sample size of 100 was chosen since the questions totaled 10. Using systematic sampling, the step was initially calculated by finding what percentage of the sample was chosen. In this case, given 289/100≅3, a number from 1 to 3 was randomly selected and this number was considered as the step for the final selection of the sample from the list of 289. In this case, the step was the number 3. So, the 3rd, the 6th =(3+3), the 9th=(3+6) and so on were selected from the numbered alphabetical catalog[17] and in total until the end of the list, with the total number of the sample coming to 96 people.

Approval–Bioethics

This study was performed following approval by the Cyprus National Bioethics Committee. In addition, all

participants signed an approval to participate prior to the study.

Study tool

The study was conducted during Spring 2019 and Winter 2019 at the Cyprus Musculoskeletal and Sports Trauma Research Centre (CYMUSTREC) of the Department of Health Sciences, Physiotherapy Program, School of Sciences, European University of Cyprus, Nicosia, Cyprus. This study included patients suffering from MTrPs of the upper trapezius muscle.

The Northwick Park Neck Pain Questionnaire

The Northwick Park NPQ is a self-administered instrument that comprises 10 items on daily activities that may be affected by neck pain. These are pain intensity, neck pain and sleeping, pins and needles or numbness in the arms at night, duration of symptoms, carrying, reading and watching TV, working/housework, social activities, and driving. Also, there is a tenth factor that is used to compare with the last time a patient answered the questionnaire, which is patient neck pain, and is not included in the NPQ final score. Each item contains one question and five answers, each with increasing difficulty or pain. The patient is asked to rate the one item that most closely describes their current situation. Each item is rated on a 0-4 scale with four representing the greatest dysfunction. The total score is obtained by adding the scores for the 9 items. At the end, a percentage is calculated by dividing the patient's score by the maximum possible, depending on the number of items answered. If all nine sections are finalized, the NPQ percentage score is summarized as: (total scored/36)x100%. If one section has not been answered, the score is summarized as: (total score/32)x100%.[5]

Translation of the Northwick Park Neck Pain Questionnaire

The Northwick Park NPQ English version was translated and adapted into the Greek language according to international guidelines for the cultural adaptation process using the three stages.[18,19] It should be noted here that permission was obtained from the authors[5] who constructed the original questionnaire.

The first stage was the forward translation of the original-English version of the NPQ (Appendix 1). Two independent translators, Greek physiotherapists with experience in English reading, produced a written report highlighting comments or any difficulties and uncertainties in their translation process. In a second stage, the results of the two reports were compared. These were then synthesized by the two translators and a recording observer into one draft of the Greek version. The third stage included the backward translation produced by two translators whose mother language is English and have no medical background. In stage four, the expert committee produced a report with emphasis on semantic, idiomatic, experiential, and conceptual equivalence that should be reached after examining the source and back-translated questionnaire.[18–23]

Pilot study

The Greek version of the new questionnaire was used for pilot testing acceptance. The authors sent messages via email and social media asking if anyone had any neck pain. Those who responded positively were assessed to determine who had triggers related to the upper trapezius muscle. The evaluators were registered physiotherapists, members of the Pancyprian Association of Physiotherapists with clinical experience in physical examination and treatment of cervical spine-related disorders. Forty subjects, Greek-speaking Cypriots, completed the Northwick Park NPQ (26 men and 14 women), mean age (44.4±9.8) with trigger points in the upper trapezius muscle. An interview was conducted with each participant in order to confirm what they thought was meant by each questionnaire section and their chosen responses. Also, the participants provided the research team with criticism or comments after completing the questionnaire. This pilot procedure was committed to ensuring that the translated version kept the identity of the original Northwick Park NPQ. All the questions and answers of the scale were considered comprehensible by the respondents, and thus no further modifications were made to the last version. In this way, the Greek version of the Northwick Park NPQ was established (Appendix 2).

Statistical analysis

Statistical analysis was performed using SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA). Quantitative variables were described by using means, standard deviations (SDs), and maximum and minimum values.

APPENDIX 1:
NORTHWICK PARK NECK PAIN QUESTIONNAIRE, ORIGINAL ENGLISH VERSION

Optimal Performance Physical Therapy

Northwick Park Neck Pain Questionnaire

Name: _____ **Signature:** _____ **Date:** _____

Please Read: This questionnaire has been designed to give us information as to how 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 realize you may consider that two of the statements in any one section relate to you, BUT PLEASE MARK THE ONE BOX THAT MOST CLOSELY DESCRIBES YOUR PROBLEM.

Section 1 - Pain Intensity:

- ☐ A. I have no pain at the moment.
- ☐ B. My pain is very mild at the moment.
- ☐ C. My pain is moderate at the moment.
- ☐ D. My pain is fairly severe at the moment.
- ☐ E. My pain is very severe at the moment.

Section 2 - Pain and Sleeping

- ☐ A. My sleep is never disturbed by pain.
- ☐ B. My sleep is occasionally disturbed by pain.
- ☐ C. My sleep is regularly disturbed by pain.
- ☐ D. Because of pain I have less than 5 hours sleep in total.
- ☐ E. Because of pain I have less than 2 hours sleep in total.

Section 3 - Pins, Needles or Numbness in Arms at Night

- ☐ A. I have no pins and needles or numbness at night.
- ☐ B. I have occasional pins and needles or numbness at night.
- ☐ C. My sleep is regularly disturbed by pins and needles or numbness.
- ☐ D. Because of pins and needles or numbness I have less than 5 hours sleep in total.
- ☐ E. Because of pins and needles or numbness I have less than 2 hours sleep in total.

Section 4 - Duration of Symptoms

- ☐ A. My neck and arms feel normal all day.
- ☐ B. I have symptoms in my neck or arms on walking, which last less than one hour.
- ☐ C. Symptoms are present on & off for a total period of 1-4 hrs.
- ☐ D. Symptoms are present on & off for a total of more than 4 hrs.
- ☐ E. Symptoms are present continuously all day.

Section 5 -Carrying

- ☐ A. I can carry heavy objects without extra pain.
- ☐ B. I can carry heavy objects, but they give me extra pain.
- ☐ C. Pain prevents me from carrying heavy objects, but I can manage medium weight objects.
- ☐ D. I can only lift light weight objects.
- ☐ E. I cannot lift anything at all.

Section 6 - Reading and Watching TV

- ☐ A. I can do this as long as I wish with no problems.
- ☐ B. I can do this as long as I wish, if I'm in a suitable position.
- ☐ C. I can do this as long as I wish, but it causes extra pain.
- ☐ D. Pain causes me to stop doing this sooner than I would like.
- ☐ E. Pain prevents me from doing this at all.

Section 7 - Working/Housework, Etc.

- ☐ A. I can do my usual work without extra pain.
- ☐ B. I can do my usual work, but it gives me extra pain.
- ☐ C. Pain prevents me from doing my usual work for more than half the usual time.
- ☐ D. Pain prevents me from doing my usual work for more than a quarter of the usual time.
- ☐ E. Pain prevents me from working at all.

Section 8 - Social Activities

- ☐ A. My social life is normal and causes me no extra pain.
- ☐ B. My social life is normal but increases the degree of pain.
- ☐ C. Pain has restricted my social life, but I am still able to go out.
- ☐ D. Pain has restricted my social life to the home.
- ☐ E. I have no social life because of pain.

Section 9 - Driving (if applicable)

- ☐ A. I can drive whenever necessary without discomfort.
- ☐ B. I can drive whenever necessary, but with discomfort.
- ☐ C. Neck pain or stiffness limits my driving occasionally.
- ☐ D. Neck pain or stiffness limits my driving frequently.
- ☐ E. I can not drive at all due to neck symptoms.

Section 10 - Compared with the last time you answered this question, is your neck pain:

- ☐ A. Much better.
- ☐ B. Slightly better.
- ☐ C. The same.
- ☐ D. Slightly worse.
- ☐ E. Much worse

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ΑAPPENDIX 2:
NORTHWICK PARK NECK PAIN QUESTIONNAIRE, TRANSLATED GREEK VERSION

Optimal Performance Physical Therapy

Northwick Park Neck Pain Questionnaire

Ονομα: _____ **Υπογραφή:** _____ **Ημ/νία:** _____

Διαβάστε: Το ερωτηματολόγιο αυτό έχει σχεδιασθεί για να μας δώσει πληροφορίες για το πώς ο Πόνος στον Αυχένα σας επηρεάζει στην καθημερινότητα. Παρακαλώ απαντήσατε σε κάθε ενότητα και σημειώσατε ΜΟΝΟ το κουτί εκείνο που ταιριάζει καλύτερα σε σας. Καταλαβαίνουμε πως ίσως θεωρείτε ότι δύο απαντήσεις ταιριάζουν καλύτερα σε εσάς, ΑΛΛΑ ΠΑΡΑΚΑΛΟΥΜΕ ΝΑ ΣΗΜΕΙΩΣΕΤΕ ΜΟΝΟ ΕΚΕΙΝΗ ΤΗΝ ΑΠΑΝΤΗΣΗ ΠΟΥ ΤΑΙΡΙΑΖΕΙ ΚΑΛΛΙΤΕΡΑ ΣΤΗ ΠΕΡΙΠΤΩΣΗ ΣΑΣ.

Ενότητα 1 - Ένταση πόνου:

- ☐ A. Αυτή τη στιγμή δεν αισθάνομαι πόνο.
- ☐ B. Ο πόνος είναι ήπιος αυτή τη στιγμή.
- ☐ C. Ο πόνος είναι μέτριος αυτή τη στιγμή.
- ☐ D. Ο πόνος είναι αρκετά σοβαρός αυτή τη στιγμή.
- ☐ E. Ο πόνος είναι πολύ έντονος αυτή τη στιγμή.

Ενότητα 2 - Πόνος και Ύπνος

- ☐ A. Ο ύπνος δε διαταράσσεται ποτέ από πόνο.
- ☐ B. Ο ύπνος μερικές φορές διαταράσσεται από πόνο. .
- ☐ C. Ο ύπνος διαταράσσεται τακτικά από πόνο.
- ☐ D. Λόγω του πόνου συνολικά κοιμάμαι λιγότερο από 5 ώρες στο σύνολο.
- ☐ E. Λόγω του πόνου συνολικά κοιμάμαι λιγότερο από 2 ώρες

Ενότητα 3 - Βελονιάσματα ή μουδιάσματα στα χέρια τη νύκτα

- ☐ A. Δεν έχω μουδιάσματα ή βελονιάσματα στα χέρια τη νύκτα.
- ☐ B. Περιστασιακά έχω μουδιάσματα ή βελονιάσματα στα χέρια τη νύκτα.
- ☐ C. Ο ύπνος διαταράσσεται τακτικά από τα μουδιάσματα και βελονιάσματα.
- ☐ D. Λόγω των μουδιασμάτων και βελονιασμάτων ο ύπνος μου είναι λιγότερος από 5 ώρες στο σύνολο.
- ☐ E. Λόγω των μουδιασμάτων και βελονιασμάτων ο ύπνος μου είναι λιγότερος από 2 ώρες στο σύνολο.

Ενότητα 4 - Διάρκεια Συμπτωμάτων

- ☐ A. Αισθάνομαι τον αυχένα και τους βραχίονες φυσιολογικά όλη την ημέρα.
- ☐ B. Έχω συμπτώματα στον αυχένα ή τα χέρια κατά τη βάδιση, που διαρκούν λιγότερο από μία ώρα.
- ☐ C. Τα συμπτώματα έρχονται και παρέρχονται μετά από περίοδο 1-4 ωρών.
- ☐ D. Τα συμπτώματα έρχονται και παρέρχονται μετά από περίοδο μεγαλύτερη των 4 ωρών.
- ☐ E. Τα συμπτώματα παραμένουν όλη την ημέρα.

Ενότητα 5 - Μεταφορά (αντικειμένων)

- ☐ A. Μεταφέρω βαριά αντικείμενα χωρίς πρόσθετο πόνο.
- ☐ B. Μεταφέρω βαριά αντικείμενα, αλλά με κάποιον επιπλέον πόνο.
- ☐ C. Ο πόνος με αποτρέπει από το να μεταφέρω βαριά αντικείμενα, αλλά μπορώ να μεταφέρω μέτρια βάρη.
- ☐ D. Μπορώ να σηκώσω μόνον ελαφρά αντικείμενα.
- ☐ E. Δεν είμαι σε θέση να σηκώσω οτιδήποτε.

Ενότητα 6 - Διάβασμα και Παρακολούθηση τηλεόρασης

- ☐ A. Μπορώ όση ώρα επιθυμώ χωρίς πρόβλημα.
- ☐ B. Μπορώ όση ώρα επιθυμώ, εάν έχω τη κατάλληλη θέση.
- ☐ C. Μπορώ όση ώρα επιθυμώ αλλά μου προκαλεί επιπλέον πόνο.
- ☐ D. Ο πόνος με αναγκάζει να σταματήσω νωρίτερα από ότι θα ήθελα.
- ☐ E. Ο πόνος με αποτρέπει τελείως.

Ενότητα 7 - Εργασία, Δουλειές σπιτιού, Κ.λπ.

- ☐ A. Εκτελώ τις συνήθεις εργασίες χωρίς πρόσθετο πόνο.
- ☐ B. Εκτελώ τις συνήθεις εργασίες αλλά με πρόσθετο πόνο.
- ☐ C. Ο πόνος με αποτρέπει από το να εκτελώ τις συνηθισμένες εργασίες περισσότερο από τις μισές φορές.
- ☐ D. Ο πόνος με αποτρέπει απο το να εκτελώ τις συνήθεις εργασίες περισσότερο από το ένα τέταρτο του συνήθους χρόνου.
- ☐ E. Ο πόνος δε με αφήνει να εκτελέσω καμία εργασία.

Ενότητα 8 - Κοινωνικές Δραστηριότητες

- ☐ A. Η κοινωνική μου ζωή είναι φυσιολογική και δεν προκαλεί περισσότερο πόνο.
- ☐ B. Η κοινωνική μου ζωή είναι φυσιολογική αλλά μου αυξάνει τον πόνο.
- ☐ C. Ο πόνος περιορίζει τη κοινωνική ζωή αλλά είμαι ακόμα σε θέση να ανταπεξέρχομαι.
- ☐ D. Ο πόνος περιορίζει τη κοινωνική ζωή μέσα στο σπίτι.
- ☐ E. Λόγω του πόνου δεν έχω κοινωνική ζωή.

Ενότητα 9 - Οδήγηση (εάν οδηγείτε αυτοκίνητο)

- ☐ A. Μπορώ να οδηγήσω όπο χρειάζομαι χωρίς πρόβλημα.
- ☐ B. Μπορώ να οδηγήσω όποτε χρειάζεται αλλά με δυσφορία.
- ☐ C. Ο πόνος ή η δυσκαμψία στον αυχένα με περιορίζουν ορισμένες φορές από την οδήγηση.
- ☐ D. Ο πόνος ή η δυσκαμψία στον αυχένα με περιορίζουν συχνά από το να οδηγώ.
- ☐ E. Δεν είμαι σε θέση να οδηγήσω λόγω της σμπτωματολογίας από τον αυχένα.

Ενότητα 10 - Συγκριτικά με τη τελευταία φορά που απαντήσατε σε αυτές τις ερωτήσεις, ο πόνος στον αυχένα είναι:

- ☐ A. Αρκετά καλύτερα .
- ☐ B. Ελαφρά καλύτερα.
- ☐ C. Τα ίδια.
- ☐ D. Ελαφρά χειρότερα.
- ☐ E. Πολύ χειρότερα.

Σελίδα 1 από 1

Reliability

The internal consistency of the Northwick Park NPQ was determined using Cronbach's alpha (α) coefficient, which represents a measure of how well each question (item) of the scale is correlated with the sum of the remainders. Values of Cronbach's α equal to or greater than 0.7 indicate good reliability, while values 0.9 and above indicate excellent reliability of the method.[20,21,24]

Test–retest reliability was assessed with the use of intraclass correlation coefficient (ICC) for each of the 9 items of the questionnaire. This method gives complementary information, as shown by Greg and Nevill[25] and Lin,[26] since it determines the degree to which the same test results are acquired for repeated assessments, although no actual change is predicted in the intervening period.[27,28] The ICC can range from 0 to 1, with values closer to 1 representing stronger reliability. Based on the 95% confidence interval of the ICC estimate, values less than 0.5, between 0.5 and 0.75, between 0.75 and 0.90, and greater than 0.90 are indicative of poor, moderate, good, and excellent reliability, respectively.[29]

Validity

Factor analysis was used to test the structural validity of the translated Northwick Park NPQ. Factor analysis is a complex statistical method conducted for various purposes, one of which is to assess the construct validity of a scale or a number of scales. Factor analysis was performed by using principal component analysis to extract factors. The retained factors in each scale had eigenvalues greater than 1. Independent factors were obtained by using the varimax rotation method.[20,21,24] The level of significance was set at $p<0.05$.

This method measures the degree to which a scale accurately represents the dimensions of the phenomenon it intends to describe, explain, or formulate at a theoretical level. In most analyses, the validity is related to reliability and this statistical technique can be used on a group of items in order to determine whether the items from coherent subsets or are self-sufficient). In order to discover underlying factors or dimensions of the Northwick Park NPQ scale, our data (96) passed Bartlett's Test of Sphericity (p value\0.01), and items were analyzed by factor analysis with the extraction method of principal axis factoring with varimax rotation. Factors were elicited according to the Kaiser criterion of maintaining eigenvalues larger than 1. In principal axis factoring, the analysis of data structure focuses on shared variance and not on sources of error that are unique to individual measurements.

Results

The results are described using mean ±SD (minimum and maximum value). In the present study, 96 subjects participated: 36 men (37.5%) and 60 women (62.5%). Seventy-four (77.1 %) of them were right-handed and 22 (22.9 %) left-handed. Thirty-nine (40.6%) did sedentary work and 57 (59.4%) were engaged in other work.

Study population

Most, a total of 65 people, said they had pain in both trapezius muscles, 45 out of whom had more pain in the right muscle. On average, left-handed patients had pain in the left muscle for 3.10 years with SD of 3.84 years and on average had pain in the right muscle for 2.88 years with SD of 2.16 (table 1). Data concerning the clinical picture of the patients is presented in Table 1. For the question if they were undergoing any other treatment or if they had taken painkillers in the last 24 hours, the answer was no.

Table 1. *Demographic and clinical characteristics and demographics of the patients.*

Variable	Mean	SD	Minimum	Maximum
Age	39.12	5.80	29	51
Weight (kg)	79.70	15.83	59	101
Height	1.62	0.16	1.51	1.84
Pain in the left muscle (years)	3,10	1.84	0	11
Pain in the right muscle (years)	2.88	1.16	0	10

Reliability

Cronbach's α of the internal consistency of the Northwick Park NPQ for the first measurement was 0.830 (table 2) and for the second 0.870 (table 3). Cronbach's α overall reliability coefficients for test 1 and test 2 for the Northwick Park NPQ were 0.926 (table 4). These results indicated a satisfactory level of construct validity and internal consistency of the Greek questionnaire. Also, it was established as suitable to measure the extent of pain caused by upper trapezius trigger points. Examination of individual item statistics suggested that no elimination of items would increase the reliability of the scale.

The ICC of the Northwick Park NPQ showed the following scores: 0.866 for pain intensity (95% CI, 0.848-0.880), 0.979 pain and sleeping (95% CI, 0.958-0.989), 0.939 for pins and needles or numbness in the arms at night (95% CI, 0.905-0.961), 0.970 duration of symptoms (95% CI, 0.953-0.981), 0.933 for carrying (95% CI, 0.900-0.955), 0.870 for reading and watching TV (95% CI, 0.815-0.840), 937 for working/housework, etc. (95% CI, 0.909-0.965), 0.966 for social activities (95% CI, 0.953-0.981), and 0.973 for driving (95% CI, 0.954-0.983) (table 5).

Table 2. *Cronbach's alpha for the Northwick Park Neck Pain Questionnaire 1.*

	Item-Total Statistics			
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Pain intensity	20,14	15,529	,634	,735
Pain and sleeping	20,24	17,279	,766	,736
Pins, needles or numbness in the arms at night	20,15	19,557	,239	,788
Duration of symptoms	19,10	14,200	,545	,760
Carrying	20,24	20,100	,140	,798
Reading and Watching TV	19,32	18,158	,387	,772
Working/Housework, etc.	20,23	16,368	,605	,741
Social Activities	20,39	17,124	,548	,751
Driving	20,20	17,613	,464	,763

Table 3. *Cronbach's alpha for the Northwick Park Neck Pain Questionnaire 2.*

	Item-Total Statistics			
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Pain intensity 1	19,2500	23,768	,608	,848
Pain and sleeping 1	19,4167	25,172	,807	,839
Pins, needles or numbness in the arms at night 1	19,8333	27,593	,423	,864
Duration of symptoms 1	18,2500	21,074	,619	,856
Carrying 1	19,7500	23,263	,761	,834
Reading and Watching TV 1	18,5000	26,526	,387	,867
Working/Housework, etc. 1	19,3333	22,793	,738	,835
Social activities 1	19,6667	24,646	,620	,847
Driving 1	19,3333	24,814	,567	,852

Table 4. *Cronbach's alpha overall reliability coefficient – test 1 and test 2 for the Northwick Park Neck Pain Questionnaire*

	Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Squared Multiple Correlation**	**Cronbach's Alpha if Item Deleted**
Pain intensity	42,62	71,732	,577	.	,880
Pain and sleeping	43,24	71,679	,823	.	,875
Pins, needles or numbness in the arms at night	43,15	76,652	,264	.	,889
Duration of symptoms	42,10	64,157	,676	.	,876
Carrying	43,27	77,105	,236	.	,889
Reading and Watching TV	42,24	73,595	,375	.	,887
Working/Housework, etc.	43,28	71,341	,566	.	,880
Social Activities 1	43,37	71,542	,581	.	,880
Driving	43,22	71,752	,531	.	,881
Pain intensity 1	43,14	68,855	,641	.	,877
Pain and sleeping 1	43,24	71,679	,823	.	,875
Pins, needles or numbness in the arms at night 1	43,15	76,336	,301	.	,888
Duration of symptoms 1	42,10	64,157	,676	.	,876
Carrying 1	43,24	77,216	,220	.	,890
Reading and Watching TV 1	42,32	73,842	,426	.	,885
Working/Housework, etc. 1	43,23	69,379	,698	.	,875
Social activities 1	43,39	71,713	,583	.	,880
Driving 1	43,20	72,939	,485	.	,883

Validity

As confirmed earlier, since the data passed Bartlett's Test of Sphericity, a factor analysis was conducted. The extraction method used was generalized least squares, and the rotation method was varimax with Kaiser normalization. The results revealed there were three factors that explained the 76,745% of eigenvalues. The first factor explained the 46,328% of the total of eigenvalues, the second the 17,588%, and the third the 12,829%. The individual loadings of questions (items) for these three factors are presented in tables 6 and 7.

Discussion

The purpose of this study was to translate and validate the original Northwick Park NPQ in the Greek language. The first reason for selecting the NPQ to be adapted into Greek was due to its potential ability to determine the spectrum of neck disability and, during participation in activities, pain intensity, pins and needles or numbness in the arms at night, duration of symptoms, reading and watching TV, working/housework, social activities, and driving. The second reason was because this instrument has been translated and validated in many other languages.[5–13]

The translation and adaptation of the NPQ into the Greek language was successfully carried out. No adaptations were applied after the pilot. The instrument took a short time, not more than 5 minutes, to be completed by the participating subjects and they reported that it was easily understood. Methodologically, questionnaires are very useful tools for collecting patient information and they should be clear, short, simple, practical, and applicable for the target population.[30] The NPQ Greek version met these essential elements of a health status index.

Table 5. *Test–retest scores of the NPQ to evaluate reliability in patients with upper trapezius trigger points (n = 96)*

Item Statistics			
	Mean	**Std. Deviation**	
Pain intensity	2,88	,798	,975
Pain and Sleeping	2,26	,585	,585
Pins, needles or numbness in the arms at night	2,35	,665	,649
Duration of Symptoms	3,40	1,318	1,318
Carrying	2,23	,640	,653
Reading and Watching TV	3,26	,897	,781
Working/Housework, Etc.	2,22	,849	,864
Social Activities	2,13	,811	,793
Driving	2,28	,855	,796

Factors	**Mean score (1 evaluation)**	**Mean score (2 evaluation)**	**ICC**	**95% Confidence interval**
Pain intensity	2,88	2,36	0.866	0.848-0.880
Pain and sleeping	2,26	2,26	0.979	0.958-0.989
Pins, needles or numbness in the arms at night	2,35	2,35	0.939	0.905-0.961
Duration of symptoms	3,40	3,40	0.970	0.953-0.981
Carrying	2,23	2,26	0.933	0.900-0.955
Reading and Watching TV	3,26	3,18	0.870	0.815-0.840
Working/Housework, etc.	2,22	2,27	0.937	0.909-0.965
Social activities	2,13	2,11	0.966	0.953-0.981
Driving	2,28	2,30	0.973	0.954-0.983

ICC: Intraclass correlation coefficient between evaluations

Table 6. *Factors in factor analysis of the three translations of the Northwick Park Neck Pain Questionnaire.*

Factors	**Eigenvalue**	**% Variance**	**Cumulative %**
Factor 1	4,170	46,328	46,328
Factor 2	1,583	17,588	63,916
Factor 3	1,155	12,829	76,745

According to present results, the translated Northwick Park NPQ seems to be reliable and valid for Greek-speaking middle-aged patients with active MTrPs of the upper trapezius muscle. Moreover, the scale is suitable for different cervical spine disorders, such as mechanical neck pain whiplash injury with associated neck symptoms and relative vertebral column pathologies.[9]

This study measured the internal consistency of the Greek NPQ using Cronbach's α value. Santos[31] and Taber[32] supported that a correlation coefficient up to 0.95 represents high to excellent reliability, validity, and objectivity. A low α value could be due to poor inter-relatedness between questions, a small number of questions, or heterogeneous composition. A very high value may indicate that some items are unnecessary. The present study showed internal consistency, close to 0.996. Therefore, the results should be interpreted with caution, since the high internal

Table 7. *Varimax-rotated factor matrix of the Northwick Park Neck Pain Questionnaire.*

Rotated Factor Matrix*			
	Factor		
	1	2	3
Pain intensity	.963		
Pain and sleeping	.840	.506	
Carrying	.585		
Reading and Watching TV	.585		
Working/Housework, etc.	.511		
Social activities		.990	
Duration of symptoms		.549	
Driving			
Pins, needles or numbness in the arms at night			.430
Extraction Method: Generalized Least Squares. Rotation Method: Varimax with Kaiser Normalization.			

* Rotation converged in 4 iterations.

consistency perhaps produced a scale that is quite narrow in content.

The Cronbach's α values obtained in the present study are similar with the values of those in translations of the same questionnaire into other languages. For example, Chiu et al[7] examined the reliability, validity, and responsiveness of the Chinese version of the Northwick Park NPQ in Chinese patients with neck pain in Hong Kong. In their study, 532 patients participated with neck pain that was measured at the beginning of physiotherapy, at 7 days, at 3 weeks, and at 6 weeks after physiotherapy. The authors found a Cronbach's α of 0.87. A Cronbach's α of 0.90 was found by Aguirre et al,[6] who carried out cultural adaptation and validation of the NPQ in 60 patients with mechanical neck pain in Argentina. Similarly, Gonzalez et al,[8] in a methodologically very well designed study, validated a Spanish version of the NPQ. In their study, 58 patients with neck pain participated and completed the questionnaire. The results showed that the ICC between the test–retest NPQ was r=0.63. The mean scores for each section increased with that of the intensity of pain, in most sections showing good internal consistency. The authors concluded that the Spanish version of the NPQ was a reliable and valid questionnaire to determine pain in Spanish-speaking patients with neck pain.

Other examples of researchers who have translated and validated the original scale in their country's national language are Wlodyka-Demaille et al[11] (French), Kose et al[10] (Turkish), and Lee et al[12] (Korean). They all reported Cronbach's α values that ranged between 0.80 and 0.98.

Greek NPQ outcomes

The 95% confidence interval was used to statistically evaluate the test–retest reliability via ICC. The level of reliability for the total score of the NPQ of the two determinations was very good. Also, it is worth mentioning that ICC values for each factor of the instrument (such as pain intensity, pins and needles or numbness in the arms at night, duration of symptoms, reading and watching TV, working/housework, social activities, and driving) and separately for each item ranged between 0.850 and 0.985. These ICC numbers indicated excellent reliability.[33] The data of this study supports that the Greek version of the NPQ is a valid and reliable instrument as it continues to be stable between the two assessments and produced similar results. The ICC variation scores of the present study are quite similar to those of previous studies.[5–13]

Leak et al[5] constructed the NPQ considering the Oswestry Low Back Pain Disability Questionnaire. As these authors supported, the instrument was designated to test in a simple way neck pain and its resultant disability. The items of the questionnaire give researchers a percentage score of a patient's level of participation in activities in daily life. Most of the subjects participating in the present study found the translated questions understandable and easy to be completed. No problems were found with the section factors.

Conclusions and Implications

In conclusion, our study suggests that the Greek translated version of the NPQ is culturally equivalent with the original Northwick Park scale, and it is a practical, reliable, and valid instrument for measuring outcome for Greek-speaking patients with neck pain that has originated from the upper trapezius muscle trigger point. In the future, more studies must be done to assess the reliability and validity of the instrument for various other musculoskeletal conditions.

ABSTRACT

Η Αξιοπιστία και Εγκυρότητα της ελληνικής Έκδοσης του Ερωτηματολογίου Northwick Park Neck Pain: Μελέτη Εφαρμογής σε Ασθενείς με Σημεία Πυροδότησης Πόνου του Άνω Τραπεζοειδούς Μυός

Παναγιώτης Ρεντζιάς,[1] Δημήτριος Στασινόπουλος[2]

[1]Κλινικός Εκπαιδευτής Φυσικοθεραπείας, Τμήμα Επιστημών Υγείας, Σχολή Θετικών Επιστημών, Ευρωπαϊκό Πανεπιστήμιο Κύπρου, Κύπρος,
[2]Επίκουρος Καθηγητής Φυσικοθεραπείας, Τμήμα Φυσικοθεραπείας, Πανεπιστήμιο Δυτικής Αττικής, Μέλος του Ερευνητικού Εργαστηρίου Νευρομυϊκής και Καρδιοαγγειακής Μελέτης της Κίνησης (LANECASM), Αιγάλεω, Αθήνα

Εισαγωγή: Τα σημεία πυροδότησης πόνου είναι ένα μυοσκελετικό πρόβλημα που επηρεάζει τη ζωή των ασθενών. Τα κύρια συμπτώματα αυτής της συχνής κατάστασης είναι ο πόνος, η μειωμένη λειτουργικότητα και η μείωση του εύρους κίνησης του αυχένα. Παρά το γεγονός ότι το ερωτηματολόγιο "Northwick Park Neck Pain" χρησιμοποιείται για την αξιολόγηση της λειτουργικότητας σε ασθενείς με σημεία πυροδότησης πόνου του άνω τραπεζοειδούς, δεν υπάρχει έγκυρη και αξιόπιστη ελληνική έκδοση του ερωτηματολογίου. **Σκοπός:** Σκοπός της μελέτης ήταν η αξιολόγηση της αξιοπιστίας και της εγκυρότητας της σταθμισμένης ελληνικής έκδοσης του ερωτηματολογίου. **Υλικό και Μέθοδος:** Ακολουθήθηκαν τα συνήθη στάδια για τη διαπολιτισμική στάθμιση ενός ερωτηματολογίου. Το ερωτηματολόγιο δόθηκε σε 96 ασθενείς που έπασχαν από σημεία πυροδότησης πόνου του άνω τραπεζοειδούς μυός. Όλοι οι συμμετέχοντες συμπλήρωσαν το ερωτηματολόγιο δεύτερη φορά σε διάστημα 24 ωρών. Η στατιστική ανάλυση περιελάμβανε τη μέτρηση της εσωτερικής συνοχής με τον συντελεστή Cronbach's a και ο δείκτης εσωτερικής αξιοπιστίας για τη συμφωνία των απαντήσεων μεταξύ μετρήσεων. Επιπλέον, αξιολογήθηκε η εγκυρότητα με παραγοντική ανάλυση. **Αποτελέσματα:** Τα αποτελέσματα έδωσαν μετά από την ανάλυση, τιμή 0,926 στον συντελεστή Cronbach's α. Περαιτέρω, ο συντελεστής εσωτερικής αξιοπιστίας κυμαινόταν μεταξύ 0,933 και 0,970, δείχνοντας αποδεκτή σταθερότητα. Η εγκυρότητα μετρήθηκε με ανάλυση παραγόντων και έδειξε ισοτιμές 76,745 της συνολικής διακύμανσης, ενώ το φορτίο παραγόντων κυμαινόταν μεταξύ 0,430 και 0,963. **Συμπεράσματα:** Συμπεραίνεται ότι η σταθμισμένη ελληνική έκδοση του ερωτηματολογίου Northwick Park Neck Pain είναι έγκυρη και αξιόπιστη. Ως εκ τούτου, μπορεί να χρησιμοποιηθεί για την αξιολόγηση του πόνου και της λειτουργικότητα που προκαλείται από σημεία πυροδότησης πόνου στον άνω τραπεζοειδή μυ σε Ελληνόφωνους ασθενείς.

Λέξεις-ευρετηρίου: *Αξιοπιστία, εγκυρότητα, neck pain ερωτηματολόγιο.*

✉ **Υπεύθυνος αλληλογραφίας:** Παναγιώτης Ρεντζιάς, Τμήμα Επιστημών Υγείας, Σχολή Θετικών Επιστημών, Ευρωπαϊκό Πανεπιστήμιο Κύπρου, Διογένους 6, 2404 Έγκωμη, P.O. Box: 22006, 1516, Λευκωσία, Κύπρος, Tel: (+35) 722 559 565, e-mail: p.rentzias@external.euc.ac.cy

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