ARCHIVES OF HELLENIC MEDICINE: ISSN 11-05-3992

ORIGINAL PAPER
ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

# The association between the physical activity of patients with idiopathic chronic neck pain and their psychological state

ARCHIVES OF HELLENIC MEDICINE 2017, 34(1):100–103
ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2017, 34(1):100–103

**Z. Dimitriadis,[1,2]**
**E. Kapreli,[1]**
**N. Strimpakos,[1,2]**
**J. Oldham[2]**

*[1]Department of Physiotherapy, Faculty of Health and Caring Professions, Technological Educational Institute of Sterea Ellada, Lamia, Greece*
*[2]Manchester Academic Health Sciences Centre, University of Manchester, Manchester, UK*

OBJECTIVE **Investigation of the association between physical activity in patients with idiopathic chronic neck pain and their psychological state.** METHOD **Data were collected from 45 patients with chronic idiopathic neck pain. Three instruments were used: the Hospital Anxiety and Depression Scale to assess their level of anxiety and depression, the Pain Catastrophizing Scale and the Tampa Scale for Kinesiophobia. Their physical activity level was recorded using the Baecke Questionnaire for Habitual Physical Activity.** RESULTS **Depression showed significant negative correlation with physical activity (r=-0.39, p<0.01) and sport-related physical activity (r=-0.34, p<0.05). All other relationships were non-significant (p>0.05). Physical activity was predicted by a model, including both depression and kinesiophobia as significant predictors (R=0.5, $R^2$=0.25, adjusted $R^2$=0.17, p<0.05).** CONCLUSIONS **Kinesiophobia and depression appear to be associated with physical activity in patients with chronic neck pain. Limitation in physical activity may further exacerbate the physical and psychological state of these patients. Recognition of the psychological determinants of physical activity can indicate potential therapeutic markers for the management of physical activity limitation in this population.**

Υπάρχει συσχέτιση μεταξύ της σωματικής δραστηριότητας των ασθενών με ιδιοπαθή χρόνιο αυχενικό πόνο και της ψυχολογικής τους κατάστασης;

*Περίληψη στο τέλος του άρθρου*

**Key words**

Anxiety
Catastrophizing
Depression
Kinesiophobia
Physical activity

*Submitted 23.4.2016*
*Accepted 5.5.2016*

Chronic neck pain is a neuromusculoskeletal condition which is frequently accompanied by disturbances in the psychological state, including anxiety, depression, kinesiophobia and catastrophizing.[1] It has also been suggested that physical activity may also be affected.[2] The psychological condition of patients with neck pain has been implicated as one of the factors restraining them from physical activities.[3,4] Although the relevant research has provided documentation of a connection between the physical activity of patients with neck pain and their psychological state,[3–5] the evidence is limited. Studies are lacking on patients with chronic idiopathic neck pain, whose psychological state and physical activity may differ considerably from those of patients with acute neck pain or neck pain of traumatic origin.

The aim of this study was to investigate the association between the physical activity of patients with chronic idiopathic neck pain and their psychological state (anxiety, depression, kinesiophobia, catastrophizing), and to construct a model for predicting their physical activity level based on their psychological state.

## MATERIAL AND METHOD

### Sample

Data were elicited from 45 patients with chronic idiopathic neck pain of more than 6 months duration, with at least one episode of pain per week, who had been recruited for a previously published study.[6] The sample was composed mainly of females (males/females: 12/32), with an age of 35.9±14.5 years, mild to moderate neck pain (visual analogue scale: 45.5±18.8 mm) and mild disability (Neck Disability Index: 10.6±5.2). Details of the sample

characteristics and eligibility criteria are provided in a previous publication.[6] The study was approved by the Ethics Committee of the Department of Physiotherapy, School of Health and Caring Professions, Technological Educational Institute of Lamia, Greece and the University of Manchester Ethics Committee, UK.

### Questionnaires

Neck pain intensity and self-reported disability were recorded by using a visual analogue scale for pain intensity and the Neck Disability Index. Anxiety and depression were measured by the Hospital Anxiety and Depression Scale, catastrophizing by the Pain Catastrophizing Scale and kinesiophobia by the Tampa Scale for Kinesiophobia, all three scales cross-culturally validated. Details of these questionnaires are provided in previous publications.[6,7]

Physical activity level was recorded using the Baecke Questionnaire of Habitual Physical Activity (BQHPA) cross-culturally validated in the Greek language.[8] BQHPA is a 16-item instrument with three distinct subscales (work-related activity, sport-related activity, leisure-related activity). Each item provides potential answers in an ordinal scale, rating from 1 to 5. The total BQHPA score may range from 3 to 15; the higher the score the higher the physical activity level.

### Data analysis

Correlations between the psychological state categories (anxiety, depression, kinesiophobia, catastrophizing) and the physical activity level and each of its dimensions (work-, sport- and leisure-related physical activity) were examined using the Pearson correlation coefficient. Multiple regression analysis (enter method) was used for the prediction of physical activity level, using as predictors the four psychological categories. The Statistical Package for Social Sciences (SPSS), version 17.0 was used for statistical analysis.

## RESULTS

Physical activity was not significantly correlated with either self-reported disability (r=-0.02, p>0.05) or usual neck pain intensity (r=0.18, p>0.05).

Depression was shown to be significantly associated with the overall physical activity level (r=-0.39, p<0.01) and with the dimension of sport-related physical activity (r=-0.34, p<0.05). All other correlations between physical activity and psychological categories were non-significant (p>0.05). These results are presented in table 1.

In multiple regression analysis, depression and kinesiophobia were found to be the only significant predictors of physical activity (p<0.05). The model significantly fit the data overall (p<0.05), the multiple correlation coefficient was satisfactory (R=0.5, $R^2$=0.25, adjusted $R^2$=0.17) and there was no multicollinearity problem (tolerance >0.54). The assumptions of independent errors (Durbin-Watson statistic=2.44), normally distributed errors (histogram with a superimposed normal curve), homoscedasticity and linearity (plot of standardized predicted values against standardized residuals) were met.

## DISCUSSION

Depression was shown to have a significant negative correlation with physical activity in patients with chronic idiopathic neck pain. This association suggests that either patients with a higher level of physical activity tend to be less depressed or that less depressed patients tend to be more active. This association has its origins in sport-related physical activity, since work- and leisure-related physical activity were not associated with the level of depression.

Kinesiophobia was not found to be directly associated with physical activity level in patients with neck pain, in agreement with findings from previous studies.[4,5] In parallel with depression, kinesiophobia was included in the regression model as a significant positive predictor of

**Table 1.** Association of categories of psychological state with level of physical activity (PA) level in patients with chronic idiopathic neck pain (n=45).

| | Correlations (r) | | | | MR for physical activity level | |
|---|---|---|---|---|---|---|
| | Work-related PA | Sport-related PA | Leisure-related PA | Total PA | B (95% CI) | B |
| Constant | | | | | 6.64 (4.8, 8.49)*** | |
| Anxiety | 0.00 | -0.12 | 0.08 | -0.06 | 0.02 (-0.08, 0.12) | 0.08 |
| Depression | -0.08 | -0.34** | -0.20 | -0.39** | -0.16 (-0.27, -0.05)** | -0.45 |
| Kinesiophobia | 0.01 | 0.05 | 0.22 | 0.16 | 0.07 (0.00, 0.13)* | 0.35 |
| Catastrophizing | 0.04 | -0.26 | 0.04 | -0.14 | -0.02 (-0.06, 0.02) | -0.15 |

The table presents Pearson correlation coefficients (r). The multiple regression (MR) model for the prediction of physical activity level is presented as beta values (B) with their 95% confidence intervals (95% CI) and the standardized beta values (β)

*p<0.05, **p<0.01, ***p<0.001

physical activity. Although a negative correlation would be expected, the positive direction of this correlation has also been previously noted.[5] This means that increased levels of kinesiophobia predict an increased physical activity level. This association could be explained by considering that patients who are generally less active have a low potential for injury/reinjury and therefore present low levels of kinesiophobia.

The findings of this study have important clinical implications for physicians, psychologists and other health scientists. Kinesiophobia and especially depression appear to be psychological states with a connection to the physical activity level of patients with chronic neck pain. Correlation studies cannot prove causality, so it is not clear whether physical activity may change the psychological status of these patients or whether their psychological compromise affects their physical activity level, but there are sound theoretical grounds for believing that this association is bi-directional. Based on these findings, clinicians should consider depression and kinesiophobia as potential therapeutic markers for the management of physical activity limitations in patients with chronic neck pain. Another potential implication is that targeting at improving the physical activity level of these patients could also have psychological effects, at least in terms of depression and kinesiophobia.

In conclusion, kinesiophobia and especially depression appear to be associated with physical activity in patients with chronic neck pain. Considering that limitations in physical activity may further exacerbate the patients' physical and psychological state, depression and kinesiophobia could be considered as additional therapeutic markers for the management of physical activity limitations in this clinical population.

## ΠΕΡΙΛΗΨΗ

**Υπάρχει συσχέτιση μεταξύ της σωματικής δραστηριότητας των ασθενών με ιδιοπαθή χρόνιο αυχενικό πόνο και της ψυχολογικής τους κατάστασης;**

Ζ. ΔΗΜΗΤΡΙΑΔΗΣ,[1,2] Ε. ΚΑΠΡΕΛΗ,[1] Ν. ΣΤΡΙΜΠΑΚΟΣ,[1,2] J. OLDHAM[2]

*[1]Τμήμα Φυσικοθεραπείας, Σχολή Επαγγελμάτων Υγείας και Πρόνοιας, Τεχνολογικό Εκπαιδευτικό Ίδρυμα Στερεάς Ελλάδας, Λαμία, [2]Manchester Academic Health Sciences Centre, University of Manchester, Manchester, Ηνωμένο Βασίλειο*

*Αρχεία Ελληνικής Ιατρικής 2017, 34(1):100–103*

**ΣΚΟΠΟΣ** Η εξέταση της σχέσης μεταξύ της σωματικής δραστηριότητας των ασθενών με ιδιοπαθή χρόνιο αυχενικό πόνο και της ψυχολογικής τους κατάστασης. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Τα δεδομένα συλλέχθηκαν από 45 ασθενείς με ιδιοπαθή χρόνιο αυχενικό πόνο. Οι ασθενείς είχαν προηγουμένως αξιολογηθεί για τα επίπεδα άγχους, κατάθλιψης, κινησιοφοβίας και καταστροφικών σκέψεων, χρησιμοποιώντας τις σταθμισμένες κλίμακες Hospital Anxiety and Depression Scale, Pain Catastrophizing Scale και Tampa Scale for Kinesiophobia. Η σωματική τους δραστηριότητα καταγράφηκε με το ερωτηματολόγιο Baecke Questionnaire for Habitual Physical Activity. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Η κατάθλιψη παρουσίασε αρνητική συσχέτιση με τη σωματική δραστηριότητα ($r=-0,39$, $p<0,01$) και με τη σχετιζόμενη με τον αθλητισμό σωματική δραστηριότητα ($r=-0,34$, $p<0,05$). Οι άλλες συσχετίσεις βρέθηκαν μη στατιστικά σημαντικές ($p>0,05$). Η σωματική δραστηριότητα μπορούσε να προβλεφθεί από ένα μοντέλο παλινδρόμησης που περιλάμβανε την κινησιοφοβία και την κατάθλιψη ως σημαντικούς παράγοντες πρόβλεψης ($R=0,5$, $R^2=0,25$, προσαρμοσμένο $R^2=0,17$, $p<0,05$). **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η κινησιοφοβία και κυρίως η κατάθλιψη φαίνεται ότι σχετίζονται με τη σωματική δραστηριότητα των ασθενών με χρόνιο αυχενικό πόνο. Οι περιορισμοί στη σωματική δραστηριότητα ενδέχεται να οδηγήσουν σε περαιτέρω επιδείνωση της σωματικής και της ψυχολογικής κατάστασης των εν λόγω ασθενών. Η αναγνώριση των ψυχολογικών παραγόντων πρόβλεψης της σωματικής δραστηριότητας θα μπορούσε να αποκαλύψει πιθανά σημεία θεραπευτικής παρέμβασης για τη διαχείριση των περιορισμών της σωματικής δραστηριότητας σε αυτόν τον κλινικό πληθυσμό.

**Λέξεις ευρετηρίου:** Άγχος, Κατάθλιψη, Καταστροφικές σκέψεις, Κινησιοφοβία, Σωματική δραστηριότητα

## References


1. DIMITRIADIS Z, KAPRELI E, STRIMPAKOS N, OLDHAM J. Do psychological states associate with pain and disability in chronic neck pain patients? *J Back Musculoskelet Rehabil* 2015, 28:797–802
2. SOYSAL M, KARA B, ARDA MN. Assessment of physical activity in patients with chronic low back or neck pain. *Turk Neurosurg* 2013, 23:75–80
3. HUIJNEN IP, VERBUNT JA, PETERS ML, DELESPAUL P, KINDERMANS HP, ROELOFS J ET AL. Do depression and pain intensity interfere with physical activity in daily life in patients with chronic low back pain? *Pain* 2010, 150:161–166
4. DEMIRBÜKEN I, ÖZGÜL B, KURU ÇOLAK T, AYDOĞDU O, SARI Z, YURDALAN SU. Kinesiophobia in relation to physical activity in chronic neck pain. *J Back Musculoskelet Rehabil* 2016, 29:41–47
5. CHEUNG J, KAJAKS T, McDERMID JC. The relationship between neck pain and physical activity. *Open Orthop J* 2013, 7:521–529
6. DIMITRIADIS Z, KAPRELI E, STRIMPAKOS N, OLDHAM J. Respiratory weakness in patients with chronic neck pain. *Man Ther* 2013, 18:248–253
7. DIMITRIADIS Z, KAPRELI E, STRIMPAKOS N, OLDHAM J. Hypocapnia in patients with chronic neck pain: Association with pain, muscle function, and psychological states. *Am J Phys Med Rehabil* 2013, 92:746–754
8. STRIMPAKOS N, ANASTASIADI E, PANAYIOTOU G, ATHANASOPOULOS S, KARTEROLIOTIS K, KAPRELI E. Greek version of modified Baecke physical activity questionnaire (mBQ): Cross-cultural adaptation and psychometric properties. *Physiotherapy* 2015, 101(Suppl 1):eS1446–eS1447


*Corresponding author:*

Z. Dimitriadis, Department of Physiotherapy, Technological Educational Institute of Sterea Ellada, 3rd km Old National Road Lamia-Athens, GR-351 00 Lamia, Greece
e-mail: zachariasd@hotmail.com