Neck and Upper Limb Pain: More Pain Is Associated with Psychological Distress and Consultation Rate in Primary Care

DANIELLÉ van der WINDT, PETER CROFT, and BRENDA PENNINX

ABSTRACT. Objective. To investigate the association between the extent of pain and the severity of psychological distress in neck and upper limb pain, and to establish whether extent of pain is associated with consultation frequency in primary care.

Methods. The study population was selected from responders to a general health survey conducted in a general practice in North Staffordshire, UK. Responders indicating pain in the neck or upper limb area were included. The survey included the Hospital Anxiety and Depression Scale (HADS). Consultation data were retrieved for a period of 12 months following the survey.

Results. A total of 867 responders had experienced neck-upper limb pain in the month preceding the survey (33% of all responders). Responders with more generalized pain within the neck-upper limb area had significantly higher HADS scores compared to responders with pain in one area only, particularly for depression (median scores 5 vs 3 points). Annual consultation frequency was also higher among responders with generalized pain [adjusted OR for high consultation frequency (≥ 7 visits vs 0–2 visits) 1.6, 95% CI 1.1 to 2.4]. When the analysis was restricted to consultations specifically related to neck-upper limb pain, the association between extent of pain and consultation frequency was weak and not statistically significant.

Conclusion. Our survey revealed a significant association between extent of pain in the neck-upper limb area and psychological distress, although scores for anxiety and depression were generally low, with only a small proportion of responders reporting moderate or severe symptoms. Responders with both generalized pain and depressive symptoms were more likely to consult their family doctor, but not specifically for musculoskeletal pain. These results confirm the hypothesis that general psychological well being rather than specific somatic symptoms predict consultation frequency. (J Rheumatol 2002;29:564–9)

Key Indexing Terms: NECK SHOULDER ARM PAIN DEPRESSION FAMILY PRACTICE

Pain in the neck and upper limb is a common problem, which often results in functional disability and loss of productivity at work. The prevalence of neck and upper limb pain is estimated between 20 and 45% in industrialized countries. Insurance data from Sweden show that neck-shoulder pain has a significant influence on both individuals and society. In 1994 roughly 18% of total paid sick leave for musculoskeletal disorders was spent on neck-shoulder problems, which indicates that the percentage of paid sick leave for neck-shoulder pain was approaching that of low back pain.

Increase in use of visual display units and in repetitive industrial tasks may partly explain the rising frequency of work related neck and upper limb problems. However, psychosocial factors have also been found to play an important role. These may include a poor psychosocial work environment (high psychological demands, job dissatisfaction, poor job control, or poor social support) or more general psychological factors, such as anxiety and depression.

The association between pain and psychological distress has been well studied in low back pain and chronic widespread pain or fibromyalgia (FM). Although pain can give rise to psychological distress, there are also reasons to believe that psychological distress can predict future episodes of musculoskeletal disorders or the development of chronic pain.
not merely the intensity of pain that is associated with the severity of depressive symptoms, but also the extent of the pain in terms of the surface area involved. However, this may not be limited to FM (the syndrome of “widespread pain”), but may also hold for regional pain syndromes, such as neck and upper limb pain. We studied the association between the extent of regional pain (whether or not it involves more than one area within the region) and psychological distress.

For many musculoskeletal syndromes, only a minority of sufferers seek health care, and the determinants of this remain poorly defined. Some studies have shown that both psychological factors (e.g., anxiety and depression) and severity of symptoms (e.g., duration or intensity of pain) are associated with health care seeking behavior in musculoskeletal pain. It is not known if the extent of pain is also associated with higher consultation rates. The second objective of our study, therefore, was to investigate whether consultation rates were different in those with local compared with more generalized pain in the neck and upper limb area.

MATERIALS AND METHODS

Sampling frame. In September 1996 a general health survey was conducted in a random 50% sample of all adults registered with a large general practice in North Staffordshire, UK. The total registered population in this practice was 10,000, and 4 general practitioners form the practice partnership. The survey included questions about demography (age, sex, and employment status), pain, anxiety, and depression. The responders were asked to state whether they had experienced pain or aches lasting for at least one day over the past month, and to indicate the location of these symptoms on a blank pain manikin. The intensity of their pain over the previous 4 weeks was scored on a numerical rating scale (1 to 10 points, 10 indicating worst possible pain). For our cohort study on neck-upper limb pain, we selected all responders who had shaded at least one of the relevant areas on the manikin (neck-shoulder, elbow-forearm, wrist-hand). Responders indicating unilateral pain restricted to one area only were distinguished from those with more generalized pain in the neck-upper limb area.

Psychological distress. The survey included the Hospital Anxiety and Depression Scale (HADS)24,25, a well validated measure that is particularly useful as a screening tool for symptoms of anxiety and depression in the general population26. It includes 7 items on anxiety and 7 on depressive symptoms. All items are scored on a 4 point ordinal scale (0 to 3). Total scores for anxiety and depression each range between 0 and 7 points indicating no anxiety or depression, 8 to 11 points mild, 12 to 15 points moderate, and scores of 16 or higher severe symptoms of anxiety or depression. Scores on the Hospital Anxiety and Depression Scale24 were used. For the categorical analysis, scores of 0 to 7 points indicated no anxiety or depression, scores of 8 to 11 points mild, 12 to 15 points moderate, and scores of 16 or higher severe symptoms of anxiety or depression. The association between extent of pain (either unilateral localized pain or more general pain within the region) and anxiety or depression was analyzed for (1) total HADS scores (2 sided t tests, or nonparametric tests in case of non-Gaussian distributions), and (2) the proportion of cases with no, mild, moderate, or severe scores (tests for trend across categories).

The strength of the association between extent of pain, anxiety, and depression and consultation rate was examined using multinomial logistic regression analysis with the 3 categories of consultation frequency as the dependent variable. The odds ratio (OR) for the lowest consultation tertile was set at 1.0 for each of the 3 consultation types (all, musculoskeletal problems, or neck-upper limb pain only). The odds for the other 2 consultation tertiles were separately compared to this reference category. The estimates were adjusted for age and sex. OR were computed with corresponding 95% confidence intervals. Finally, we studied whether the association between the extent of pain and consultation rate was modified by anxiety or depression by entering interaction terms in the multinomial logistic model.

RESULTS

A total of 2606 responses were received following a mailing of 3968 questionnaires, a response of 66%. A total of 867 responders indicated pain in the neck-upper limb area for at least one day during the past month (33% of the responders), and this group represented our study population. Table 1 presents the characteristics of the study population (n = 867): adults with neck-upper limb pain identified from a random population survey. Results are presented separately for those with either local or generalized pain in the neck-upper limb area.

<table>
<thead>
<tr>
<th>Local Pain*, n = 275</th>
<th>Generalized Pain, n = 592</th>
<th>p**</th>
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<tbody>
<tr>
<td>Sex, n (%)</td>
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<tr>
<td>Male</td>
<td>136 (50)</td>
<td>281 (48)</td>
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<tr>
<td>Female</td>
<td>139 (50)</td>
<td>311 (52)</td>
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<tr>
<td>Age, mean (SD)</td>
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<tr>
<td>49.6 (15.2)</td>
<td>51.3 (15.1)</td>
<td>0.11</td>
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<td>Intensity of pain in past 4 weeks (1–10), mean (SD)</td>
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<tr>
<td>5.0 (2.3)</td>
<td>5.9 (2.4)</td>
<td>0.001</td>
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<tr>
<td>Depression score (0–21), median (IQR)***</td>
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<tr>
<td>3 (1 to 6)</td>
<td>5 (2 to 8)</td>
<td>0.001</td>
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<tr>
<td>Depression: categories, n (%)</td>
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<tr>
<td>0–7 points (no depressive symptoms)</td>
<td>231 (84)</td>
<td>444 (75)</td>
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<tr>
<td>8–11 points (mild)</td>
<td>31 (11)</td>
<td>115 (19)</td>
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<tr>
<td>12–15 points (moderate)</td>
<td>9 (3)</td>
<td>28 (5)</td>
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<tr>
<td>≥ 16 points (severe)</td>
<td>4 (2)</td>
<td>5 (1)</td>
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<td>Anxiety score (0–21), median (IQR)***</td>
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<td></td>
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<tr>
<td>6 (4 to 9)</td>
<td>7 (4 to 10)</td>
<td>0.001</td>
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<tr>
<td>Anxiety: categories, n (%)</td>
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<tr>
<td>0–7 points (no anxiety)</td>
<td>178 (65)</td>
<td>313 (53)</td>
</tr>
<tr>
<td>8–11 points (mild)</td>
<td>69 (25)</td>
<td>167 (28)</td>
</tr>
<tr>
<td>12–15 points (moderate)</td>
<td>20 (7)</td>
<td>89 (15)</td>
</tr>
<tr>
<td>≥ 16 points (severe)</td>
<td>8 (3)</td>
<td>23 (4)</td>
</tr>
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</table>

* Only unilateral neck-shoulde pain (n = 196), elbow-forearm pain (n = 30), or wrist-hand pain (n = 49).
** t test for age and pain, nonparametric Mann-Whitney test for anxiety and depression scores, chi-squared test for sex, and test for trend (Kendall’s tau) for categories of anxiety and depression. ***Scores on the Hospital Anxiety and Depression Scale24.

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Table 1. Characteristics of the study population (n = 867): adults with neck-upper limb pain identified from a random population survey. Results are presented separately for those with either local or generalized pain in the neck-upper limb area.
sents age, sex, pain, and anxiety and depression scores in the study population, separately for those with local or more generalized pain. Pain or aches were localized at one area in 275 subjects (31.7%), mostly at the shoulder-neck area. The majority of the study population (n = 592) indicated more generalized symptoms within the neck-upper limb area.

Association between psychological distress and extent of pain. As the HADS scores showed a non-Gaussian distribution, particularly for depression, nonparametric tests (Mann-Whitney) were used to analyze differences between groups. Table 1 shows that scores for anxiety and depression were generally low. Moderate to severe psychological distress was reported by a small proportion of responders. Responders with generalized pain had significantly higher HADS scores, particularly for depression, with a median score of 5 [interquartile range (IQR) 2 to 8] compared to 3 (IQR 1 to 6) for those with local pain only. A smaller proportion of responders with generalized pain had HADS scores indicating no psychological distress (≤7 points): 75 vs 84% for depressive symptoms and 53 vs 65% for anxiety.

Consultation frequency. A total of 774 in the study population gave consent for review of their medical records, a response of 89%. This group did not differ from the total study population with respect to age, sex, localization of pain, and HADS scores. Of these 774, there were 680 (88%) who consulted their general practitioner at least once for any reason during the 12 months of followup. The median consultation frequency (all reasons) was 4 visits. A total of 329 (43% of the 774) responders consulted at least once for musculoskeletal pain, of whom 164 (21% of the 774) consulted at least once for neck-upper limb pain.

Table 2 presents the association of psychological distress and extent of pain at the time of the survey with consultation rates during followup (categorized in tertiles). Because of the small proportion of responders with high HADS scores, for this analysis we combined mild, moderate, and severe symptoms of anxiety or depression (≥8 points). Symptoms of psychological distress were associated with higher consultation frequency. For consultations regarding musculoskeletal pain, including neck-upper limb pain, the association was stronger for depressive symptoms than for anxiety. Thirty-four percent of responders with depressive symptoms consulted their general practitioner more than once for musculoskeletal problems, compared to 23% for those without depression.

The results presented in Table 2 also reveal that the extent of pain at the time of the survey was associated with consultation rate during followup. Consultation frequency was consistently higher for those with generalized pain. However, for consultations specifically concerning neck-upper limb problems, these differences were very small and not statistically significant (11 vs 9% for ≥2 visits per year). Multivariate analysis did not alter these results. Table 3 presents the multivariate associations of psychological distress and extent of pain with consultation frequency, adjusted for age and sex. The presence of depressive symptoms was significantly associated with a high consultation frequency. For anxiety and for extent of pain the association was statistically significant only when all consultations were considered (adjusted OR 1.6, 95% CI 1.1 to 2.4 for those with ≥7 visits compared to 0–2 visits). Again, the association between extent of pain and consultation specifically for neck-upper limb problems was very weak and not statistically significant (adjusted OR 1.2, 95% CI 0.7 to 2.1). Additional adjustment of the association for intensity of pain lowered these estimates to a modest extent.

Finally, we studied the interaction between extent of pain and psychological distress. No consistent or significant inter-
actions were found for anxiety. The presence of depressive symptoms, however, appeared to modify the association between extent of pain and consultation rate, particularly when consultation for all reasons was considered. Subgroup analyses showed the following associations with a high consultation frequency ($\geq 7$ visits versus 0–2 visits per year): both generalized neck-upper limb pain and depression ($n = 129$), adjusted OR 3.6 (95% CI 1.8 to 6.9); generalized pain but no depression ($n = 398$), adjusted OR 1.4 (95% CI 0.9 to 2.1); local pain and depression ($n = 38$), adjusted OR 1.1 (95% CI 0.4 to 2.6), compared to responders with low depression scores and local pain only ($n = 209$).

**DISCUSSION**

We found that the extent of self-reported neck-upper limb pain is associated with symptoms of psychological distress, although scores for anxiety and depression were low for most responders. Further, responders with both generalized neck-upper limb pain and depressive symptoms were more likely to consult their family doctor in the course of a year. The increased frequency of consultation can only partially be explained by psychological distress, intensity of pain, and age or sex. However, the likelihood of consulting specifically about a neck-upper limb problem was unaffected by the extent of pain.

Many studies have investigated the association between depressive symptoms and the onset or chronicity of pain, but few studies have looked specifically at the extent of pain. A cross sectional study conducted in the general population described a link between scores on a measure of psychological distress (General Health Questionnaire) and the number of tender points[13]. This suggested that the larger the number of painful areas, the more likely the presence of depressive symptoms. The results of a survey carried out in a middle aged Finnish population also confirmed that chronic musculoskeletal pain, especially multiple pains, are associated with depression[17]. Further, the onset of forearm pain was shown to be related to aspects of illness behavior, high levels of psychological distress, and the presence of other somatic symptoms[27]. A study by Dworkin, et al[28] showed that the number of pain conditions was a better predictor of major depression than measures of pain experience. The study also revealed a highly significant association between the number of pain conditions reported and elevated levels of somatization.

These findings may reflect the effect of pain on psychological distress: the more widespread the pain, the more severe, disabling and thus distressing it is. However, prospective studies have also shown that depressive symptoms can predate the onset or chronicity of pain[12,13,17,20], and hence it may be that the more distressed a patient is, the more likely they are to develop an extension or “amplification” of their pain. The progress from local or focal musculoskeletal pain to more widespread pain may be one variety of chronicity. This offers a plausible explanation of the cross sectional findings of our study and others, which show that the more chronic, generalized problems are linked to higher levels of distress. However, the direction of the association between extent of pain and psychological distress cannot be established by cross sectional research. Additional prospective research should resolve the exact nature of the temporal relations between distress and extent of musculoskeletal pain.

Our study, which was aimed at a specific regional syndrome (neck-upper limb pain), confirms the findings of cross sectional studies on other pain syndromes. This suggests that psychological distress in relation to pain is not a specific feature (e.g., arising out of anxieties about being able to do your job, or boredom and depression resulting from repetitive and monotonous tasks), but is rather a nonspecific feature of the pain experience. This is emphasized by our finding that the association with the consultation frequency was particularly strong in responders with both generalized pain and depressive symptoms. The hypothesis that would arise from ideas of somatization (that general psychological well being and pain experience rather than specific somatic symptoms predict pat-

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**Table 3. Multivariate analysis* of the association of psychological distress and extent of pain with consultation frequency (categorized in tertiles) during 12 months’ followup in responders with neck-upper limb pain ($n = 774$).**

<table>
<thead>
<tr>
<th>咨询服务次数（所有原因）</th>
<th>0–2次, $n = 246$</th>
<th>3–6次, $n = 235$</th>
<th>≥7次, $n = 293$</th>
<th>咨询服务次数（肌肉骨骼疼痛）</th>
<th>None, $n = 145$</th>
<th>1次, $n = 134$</th>
<th>≥2次, $n = 195$</th>
<th>咨询服务次数（颈部-上肢疼痛）</th>
<th>None, $n = 160$</th>
<th>1次, $n = 83$</th>
<th>≥2次, $n = 81$</th>
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<tr>
<td>抑郁症状分数</td>
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<tr>
<td>无抑郁（OR）</td>
<td>1.0</td>
<td>1.5 (0.9 to 2.6)</td>
<td>2.2 (1.3 to 3.6)</td>
<td>1.0</td>
<td>1.2 (0.7 to 2.0)</td>
<td>1.7 (1.1 to 2.5)</td>
<td>1.0</td>
<td>1.6 (0.9 to 2.8)</td>
<td>1.8 (1.0 to 3.2)</td>
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<tr>
<td>焦虑症状分数</td>
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<tr>
<td>无焦虑（OR）</td>
<td>1.0</td>
<td>1.0 (0.7 to 1.5)</td>
<td>1.6 (1.1 to 2.4)</td>
<td>1.0</td>
<td>1.1 (0.7 to 1.7)</td>
<td>1.1 (0.8 to 1.7)</td>
<td>1.0</td>
<td>1.1 (0.6 to 1.8)</td>
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<td>痛域</td>
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<tr>
<td>局部疼痛（OR）</td>
<td>1.0</td>
<td>1.2 (0.9 to 1.8)</td>
<td>1.6 (1.1 to 2.4)</td>
<td>1.0</td>
<td>1.6 (1.0 to 2.4)</td>
<td>1.3 (0.9 to 1.9)</td>
<td>1.0</td>
<td>1.1 (0.7 to 1.8)</td>
<td>1.2 (0.7 to 2.1)</td>
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</table>

* Multinominal logistic regression, lowest tertile of consultation frequency is the reference category. Estimated OR are adjusted for age and sex.
terns of health care) is further strengthened by the absence of a link between extent of pain and consultation frequency for the actual problem of neck-upper limb pain in this cohort. The increased frequency observed in those with more generalized neck-upper limb pain were not statistically significant may be the result of the small number of visits for this reason. On the other hand, if there was a strong association, larger odds ratios would have been expected.

What are the practical implications of our results? The results of our study support the idea that regional pain syndromes may be classified clinically into those that are specific and localized, and those that are associated with a more extensive picture of pain. This reflects findings from other authors who have urged the differentiation between specific upper limb syndromes and nonspecific or diffuse forearm pain, clinicians who distinguish shoulder syndromes in isolation and shoulder syndromes in the context of neck or upper limb problems, and those who state that “back pain is more than pain in the back”30. Patients with generalized pain may more often suffer from psychological distress, although in our study the differences between these groups in scores for anxiety and depression were small. Of more clinical importance is the finding that those with both generalized and depressive symptoms seek health care much more frequently. These patients may fulfill criteria for somatization31, and may need specific treatment. Psychosocial treatments, such as cognitive-behavioral interventions, seem to be effective in reducing the number of doctor visits, physical symptoms, and psychological distress32-35. Randomized trials of adequate methodological quality and with sufficient followup are needed to establish effectiveness and applicability of such treatments in primary care.

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REFERENCES