

# Consultation and the Outcome of Shoulder-Neck Pain: A Cohort Study in the Population

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**ABSTRACT. Objective.** Despite the high prevalence of shoulder-neck pain in the community, and the fact that it is commonly a persistent and disabling condition, only a minority of sufferers seek medical help. We investigated the association between primary care consultation and subsequent outcome in a cohort of shoulder-neck pain sufferers.

**Methods.** A population with unilateral shoulder-neck pain was identified by a questionnaire mailed to 4002 adults randomly selected from the register of one family practice. Subjects were asked to shade areas of pain on a blank manikin, and give demographic details and scales of pain, anxiety, and depression. For the following 2 years, general practitioner (GP) consultations for shoulder and neck problems were determined using the practice database. The persistence of pain and degree of shoulder-specific disability, as well as general health status using the Medical Outcome Study Short Form-36 (SF-36), were assessed by means of a second postal survey at 2 years' followup.

**Results.** Three hundred four subjects (11.7% of questionnaire responders) had unilateral shoulder-neck pain at baseline, and 224 were included in the study analyses. Of these, 47 (21%) consulted their GP for shoulder-neck problems over the 2 years. Of the 47 consulters, 36 (77%) reported shoulder-neck pain at followup; this was a higher percentage than that for nonconsulters ( $RR_{\text{adjusted}} = 1.3$ ). Among all subjects with persistent shoulder-neck pain, consulters were more likely than nonconsulters to have shoulder related disability at followup ( $RR_{\text{adjusted}} = 1.6$ ). On average, consulters had more pain and lower levels of physical functioning at followup than nonconsulters as measured by the SF-36.

**Conclusion.** The minority of shoulder-neck pain sufferers who consult a primary care practitioner do not have better subsequent pain and disability outcomes than those who do not consult. Our findings raise questions about the current influence of medical care on the natural history of this condition. (J Rheumatol 2003;30:2694–9)

## Key Indexing Terms:

PATIENT CARE MANAGEMENT

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SHOULDER-NECK PAIN

Pain in the shoulder region is common, affecting between 7 and 34% of adults at any one time<sup>1–5</sup>, and various studies have contradicted the traditional belief that it is a benign and self-limiting problem<sup>6–8</sup>. However, data from general practice suggest that only a minority of sufferers seek health care at any one time. Data from 1991 suggested that around 1% of all UK adults consult their general practitioner each year for a new episode of shoulder pain<sup>9</sup>, and a similar figure of 11.2 consultations per 1000 patients per year has been estimated for shoulder complaints in general practice in The Netherlands<sup>10</sup>.

It is not clear what the effectiveness or influence of consultation is on clinical outcome and health status. Although randomized controlled trials are considered to provide the most reliable guide to efficacy, observational studies of outcome in a broader sample of patients than can be assembled for trials can offer an overall view of the influence of health care. One example is the recent article by Solomon, *et al* that determined outcome in a group of patients referred to specialists in an American health care organization<sup>11</sup>. We carried out an observational followup of patients from the general population with shoulder-neck pain to investigate their outcomes in relation to primary care consultation.

## MATERIALS AND METHODS

**Design and study population.** The study took place in a mixed urban-rural family (general) practice in North Staffordshire. There were 4 general practitioners (GP) working in this practice. In November 1995, 8004 adults aged 18–75 were registered with this practice. In the UK, most of the population are registered with a general practice, irrespective of whether they seek care or not. The register thus provides a convenient sampling frame of a local population, for which linked patterns of consultation are also available.

A postal survey was sent to a random (50%) sample of 4002 registered

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adults, enquiring about pain (via a body manikin) and psychological well being. The random sample was selected from all names on the adult practice register using EPI INFO version 6.0<sup>12</sup>. A cohort of subjects with pain in the shoulder-neck region was identified via the manikin. This cohort was followed up in 2 ways. First, GP consultations for shoulder and neck problems over the subsequent 24 months were determined from the computerized practice database. Second, in November 1997, a further questionnaire was mailed to all responders to the original survey. Consulting and nonconsulting subjects in the cohort were compared with respect to persistent shoulder-neck pain, shoulder disability, and general health as measured in this second survey.

**Baseline survey.** The case definition of "current unilateral shoulder-neck pain" for inclusion in the followup study was based on a question in the baseline survey that asked the subject to mark on a blank pain manikin any ache or pain experienced in the previous month. Shading within a specified area (on either the left or right side), as indicated in Figure 1, was used to identify subjects with unilateral shoulder-neck region pain. This method of defining shoulder-neck region pain in postal surveys has been validated<sup>13</sup>.

In order to adjust subsequent pain, disability, and consultation rates in this cohort for baseline predictors, we incorporated a number of other measures from the baseline survey. These included current severity of the most troublesome pain (referring to worst pain over the past 4 weeks and measured on a 10-point scale: 1 = no pain at all to 10 = worst possible pain), duration of the respondent's most troublesome pain during the previous 12 months, and comorbid pain defined as pain on the body manikin other than in the shoulder-neck region. Also included were demographic queries (age, sex, employment status). A subject's social class was defined according to whether the named current occupation was manual or nonmanual using the Standard Occupational Classification of the Office of Population Censuses and Surveys, UK<sup>14</sup>. Psychological distress was measured by the Hospital Anxiety and Depression Scale<sup>15</sup>, a well validated screening test for the general population<sup>16,17</sup> used to identify anxiety and depression. Cases of anxiety or depression are defined according to the total score for a subgroup of questions (< 8 = non-case; 8–10 = borderline case; > 10 = definite case)<sup>18,19</sup>.

**GP consultation.** GP consultation for shoulder and neck problems were determined using the practice computer database [Vamp Visions (™In Practice Systems)]. The reason for each consultation in the practice is recorded by the doctor using a system of morbidity coding known as the Read V5 classification. There are regular validity checks on the coding procedure; the North Staffordshire GP Research Network carries out 6-month audits of data recording quality in this practice. All consultation entries with Read V5 morbidity codes for either shoulder or neck problems were included in our study database (Table 1). Consultation for upper respiratory tract infection (URTI) was also recorded as a proxy measure for a

subject's "general propensity to consult" for common symptoms, and we adjusted for this in the analysis.

**Followup survey.** Two years after the baseline survey a followup questionnaire was sent to all subjects who had reported unilateral shoulder-neck region pain at baseline and who were still registered at the practice. Subjects were defined as having persistent shoulder-neck pain if they answered "yes" to a question asking whether they had had an ache or pain in the previous month in any part of a pre-shaded manikin (as in Figure 1); right or left or both sides were included, irrespective of the side of the original unilateral shoulder pain at baseline.

The second questionnaire also determined shoulder-specific disability using a modified 23-item version of a validated scale, the Shoulder Disability Questionnaire UK (SDQ-UK), on which a score of 5 or more indicates significant disability<sup>20</sup>. The measure of general health was the Medical Outcome Study Short Form-36 (SF-36)<sup>21</sup>.

**Analysis.** All analyses were performed on the cohort of baseline survey responders with unilateral shoulder-neck pain who consented to review of their medical records. First, we looked at the incidence of GP consultation for shoulder and neck pain in this cohort. Second, we explored the association of baseline sociodemographic and clinical characteristics with subsequent GP consultation for shoulder and neck pain in order to adjust the outcome analysis for any baseline differences between consulters and nonconsulters. Third, we carried out our primary analysis to investigate the association between GP consultation and the outcome of shoulder-neck pain. We analyzed the association between consultation and the following outcomes at followup: persistent shoulder-neck pain, shoulder-related disability, and general health. We then looked at the association between consultation and persistent shoulder-neck pain in individuals with no comorbid pain at baseline in order to explore whether the association was similar in this subgroup of "shoulder pain only" sufferers.

Analyses of the associations between GP consultation and health outcome measurements were carried out crudely and then adjusted for potentially confounding baseline patient characteristics and for consultation with URTI (as a measure of generic consulting propensity). Multivariate analyses were carried out using linear regression for numerical outcome measures (SF-36 scales) and Cox regression (using constant time) for outcome measures with dichotomous responses (presence or absence of persistent pain and of shoulder disability). All statistical tests were assigned a 5% significance level (2-tailed testing), and data analysis was carried out using SPSS version 11.0<sup>22</sup>.

## RESULTS

**Response to surveys.** In all, 2606 subjects responded to the baseline questionnaire, a response of 65.1%. Three hundred four subjects reported unilateral shoulder-neck region pain (11.7% of responders). After 2 years, 281 of the 304 were still registered at the practice, and they received the followup questionnaire. There were 234 responders to this, a response of 83.3%. Of these responders, 224 consented for their medical records to be reviewed, and these formed the study population for our study. The age-sex profiles of the survey responders were similar to those of the nonresponders at baseline<sup>23</sup>, but followup responders were older than those who did not respond at followup<sup>24</sup>.

**Incidence of GP consultation for shoulder or neck pain and association with baseline factors.** In all, 47 (21%) subjects consulted their GP over the 24-month period for shoulder or neck complaints [26 consulted once, 9 twice, and 12 at least 3 times (maximum 6)]. The description of the codes used by the GP for these consulters is given in Table 1, together with

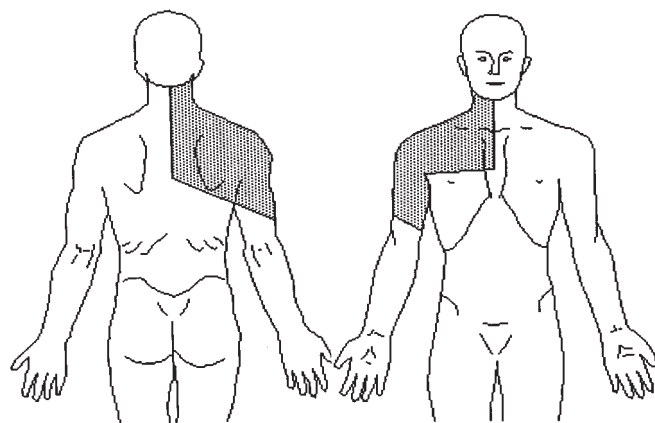


Figure 1. Area defining shoulder-neck region pain.

Table 1. Read codes describing shoulder or neck related consultation.

Read V Code	Description	No. of Individuals with Read Code in Study Period*	No. of Codes Recorded in Study Period**
N05z100	Osteoarthritis of shoulder region	2	2
N110.00	Cervical spondylosis without myelopathy	12	20
N111.01	Cervical spondylosis with myelopathy	1	1
N131.00	Cervicalgia — pain in neck	7	10
N210.12	Frozen shoulder	4	6
N211.00	Rotator cuff shoulder syndrome and allied disorders	7	13
N245.17	Shoulder pain	19	26
S4A.01	Fracture dislocation of subluxation shoulder	1	1
S50.00	Sprain of shoulder or upper arm	4	7
S570.00	Neck sprain	1	1
SK12200	Other shoulder injuries	3	3
7k6Z500	Injection of steroid into shoulder joint	2	2

\* Not mutually exclusive, so total is more than the 47 consulters in the cohort. \*\* Includes repeat consultations by the same individual.

their frequency in our study population. Consultation was associated with the following baseline factors: severity of the most troublesome pain, longer duration of the most troublesome pain, psychological distress, and not having comorbid musculoskeletal pain, although none was statistically significant (Table 2).

*Outcome of GP consultation for shoulder-neck pain.* One hundred thirty-seven (61%) subjects had persistent shoulder-neck pain at 2-year followup. In 85 (62%) subjects the problem was unilateral [69 (50%) in the same shoulder as baseline; 16 (12%) in the other shoulder] and in 52 (38%) the problem was bilateral.

Table 2. Baseline factors associated with GP consultation for shoulder or neck pain among 224 subjects with unilateral shoulder-neck pain at baseline assessment.

	Total Number of Adults	No. (%) Who Consulted	RR* (95% CI)
Age			
18–54 <sup>†</sup>	108	22 (20)	1.0
55–75	116	25 (22)	1.1 (0.6, 1.8)
Sex			
Females <sup>†</sup>	113	25 (22)	1.0
Males	111	22 (20)	0.9 (0.5, 1.5)
Employment status			
Not employed <sup>†</sup>	98	24 (25)	1.0
Employed	126	23 (18)	0.7 (0.4, 1.2)
Non-manual <sup>#</sup>	60	10 (17)	0.7 (0.4, 1.3)
Manual <sup>#</sup>	63	12 (19)	0.8 (0.4, 1.4)
Current pain score <sup>‡</sup>			
Mild <sup>†</sup>	126	23 (18)	1.0
Severe	92	23 (25)	1.4 (0.8, 2.3)
Duration of pain			
< 3 months <sup>†</sup>	85	15 (18)	1.0
≥ 3 months	133	32 (24)	1.4 (0.8, 2.4)
Psychological distress**			
No <sup>†</sup>	134	26 (19)	1.0
Yes	90	21 (23)	1.2 (0.7, 2.0)
Co-morbidity			
No <sup>†</sup>	60	17 (28)	1.0
Yes	164	30 (18)	0.6 (0.4, 1.1)

<sup>#</sup> Categories were defined according to the Standard Occupational Classification, ONS 1991. Percentages are total of those 123 subjects who reported being employed and who filled-in their job description at baseline assessment. <sup>†</sup> Current pain score dichotomy was based on a cutoff of 1–5 = mild and 6–10 = severe. \*\* HAD categories were based on a cutoff of 0–7 = no psychological distress and ≥ 8 = psychological distress. <sup>†</sup> Reference category for risk ratio analysis. \* Crude risk ratios.

Table 3. Association between GP consultation for shoulder or neck problems and persistent shoulder-neck pain at followup among 224 adults with shoulder-neck pain at baseline.

	Persistent Pain		RR* (95% CI)	RR** (95% CI)
	Yes	No		
GP consultation				
No†	101 (57%)	76 (43%)	1.0	1.0
Yes	36 (77%)	11 (23%)	1.3 (1.1, 1.6)	1.3 (0.8, 1.8)

† Reference category for statistical analyses. \* Crude risk ratios. \*\* Risk ratio adjusted for age, sex, employment status, current pain severity, duration of pain, psychological distress and co-morbid musculoskeletal pain at baseline, and GP consultation during followup for URTI.

Table 3 shows the crude and adjusted associations between GP consultation (for shoulder or neck complaints) and persistent shoulder-neck pain at followup assessment. The crude results showed that subjects who consulted their GP for shoulder or neck complaints during followup were more likely to have persistent shoulder-neck pain than those who did not consult their GP for shoulder/neck complaints. After adjusting for baseline factors that predict consultation and are therefore potential confounders, the association persisted. It also persisted after adjustment for our proxy measure of “propensity to consult” (URTI) at 2-year followup. Also, the association was little affected by the 2-year interval of GP consultation recording, since a similar association was observed when analysis was restricted to shoulder consultations in the first year of followup (RR = 1.3; 95% CI = 0.8 to 2.1 after multivariate adjustment).

Consultation in the intervening 2 years for shoulder or neck pain was associated with worse scores for perceived overall pain and physical functioning at 2-year followup, as measured by the SF-36 (Table 4). In those subjects with persistent shoulder-neck pain, there were proportionally more adults with subsequent shoulder-specific disability among consulters than nonconsulters (Table 5).

*Subgroup analysis: those without comorbid pain at baseline.* There were 60 subjects at baseline with no comorbid pain, who were therefore regarded as having isolated unilateral shoulder-neck pain. In this subgroup, consultation for shoulder-neck problems was no higher in those with more severe current pain (20% vs 31% in those with less severe pain) and had no association with the duration of pain in the past year (29% in both duration categories). This is further evidence that differences between shoulder-neck consulters and nonconsulters cannot be explained by baseline differences in duration and severity alone.

## DISCUSSION

Only a minority (21%) of our community-based subjects with self-reported shoulder-neck pain consulted their GP for neck or shoulder related reasons over a 2-year interval. Most (74%) consulted only once or twice, but 12 people consulted at least 3 times, including one person who consulted 6 times, in the 2 years.

We have reported the diagnostic codes by which we identified shoulder-neck consultations in the general practitioners’ computerized records. However, these simply represent how the general practitioners classified the

Table 4. Mean (95% confidence interval) for the associations between shoulder or neck pain consultation and subsequent general health status, using scores for the 8 dimensions of the SF-36, among 224 adults with shoulder-neck pain at baseline.

	GP Consultation for Shoulder/Neck Pain		Difference*
	No, n = 177	Yes, n = 47	
SF-36 dimensions			
Physical functioning	72.2 (68.1, 76.4)	62.0 (53.1, 70.9)	7.4 (−0.3, 15.1)
Role limitation due to physical functioning	66.9 (60.5, 73.3)	57.1 (42.6, 71.7)	8.0 (−5.3, 21.3)
Social functioning	80.5 (76.7, 84.3)	74.0 (64.9, 83.1)	2.7 (−5.2, 10.7)
Mental health	71.4 (68.5, 74.3)	69.7 (63.7, 75.6)	−0.7 (−6.4, 5.1)
Role limitation due to emotional problems	76.7 (71.0, 82.3)	75.8 (65.4, 86.2)	0.1 (−11.8, 12.0)
Energy/vitality	56.7 (53.3, 60.1)	56.3 (49.8, 62.8)	−2.5 (−9.4, 4.3)
Pain	61.3 (58.1, 64.5)	52.0 (44.5, 59.5)	7.1 (0.6, 13.7)
General health perception	63.3 (60.1, 66.5)	58.4 (51.7, 65.1)	2.1 (−4.4, 8.7)
Change in health	51.8 (48.7, 55.0)	48.4 (41.8, 54.9)	2.2 (−4.8, 9.1)

\* Mean difference (mean score for ‘no’ consultation—mean score for ‘yes’ consultation) adjusted for age, sex, employment status, current pain severity, duration of pain, psychological distress and co-morbid musculoskeletal pain at baseline; and GP consultation during followup for URTI.



Table 5. Association between GP shoulder or neck consultation and subsequent shoulder disability among 137<sup>#</sup> subjects with persistent shoulder-neck pain.

	Shoulder Disability		RR* (95% CI)	RR** (95% CI)
	Yes	No		
GP consultation				
No <sup>†</sup>	40 (43%)	54 (57%)	1.0	1.0
Yes	23 (68%)	11 (32%)	1.6 (1.1, 2.2)	1.6 (0.9, 2.8)

<sup>#</sup> Total numbers do not add to 137 due to some missing data for the measurement of shoulder disability.

<sup>†</sup> Reference category. \* Crude risk ratio. \*\* Risk ratio adjusted for age, sex, employment status, current pain severity, duration of pain, psychological distress and co-morbid musculoskeletal pain at baseline; and GP consultation during followup for URTI.

problem, and were not based on standardized diagnostic criteria. From the point of view of the study, the important distinction was between consultation versus no consultation for any of these problems.

A higher percentage of those who had consulted had both persistent pain and worse physical functioning at followup. In a nonrandomized study, it is very likely that selection factors that lead people to consult are also those that influence outcome. Most symptoms and illnesses lead to very low levels of health care utilization<sup>25</sup>, and a number of studies have investigated why some people consult and others do not. Consultation for a variety of conditions certainly depends on the presence and severity of disease. However, it is also influenced by the patient's response to symptoms and by access to care. Reported predictors of consultation include psychological morbidity<sup>26-28</sup>, extent of pain<sup>28</sup>, ethnic group<sup>29</sup>, medical knowledge<sup>30</sup>, type of incapacity<sup>31</sup>, and health status<sup>32</sup>. In our study we observed that pain severity and psychological distress were predictors of consultation for shoulder/neck pain. However, we adjusted our analysis of outcome and consultation for these baseline differences between consulters and nonconsulters, and the associations between consultation and persistent pain and disability remained. Further, the association could not be explained by subjects with persistent pain consulting just prior to the second survey. We also adjusted for the possibility that consulters simply represent a group of people more likely to consult about any symptoms, and once again this "propensity to consult" did not explain our main finding. Finally, we analyzed the subgroup with isolated shoulder-neck pain at baseline and observed that severity and duration of pain in this subgroup were not associated with consultation and so are unlikely to explain our results.

The finding of our study confirms the result of a hospital-based study of outcomes reported by Solomon, *et al*<sup>11</sup>. It raises questions as to the extent to which health care does alter natural history of shoulder-neck problems. It also raises questions about whether we see patients at the point in their consultation where intervention might be most effective in reducing pain and disability in the long term, and suggests that the classification and treatment selection in such

patients is the area we need to target in clinical research. Clearly the issue of what exactly is efficacious or effective is still most appropriately addressed within a randomized controlled trial. Observational studies can, however, continue to describe the overall impact of shoulder-neck problems and its treatment in the community.

In conclusion, this longitudinal study has shown that about one in 5 subjects with unilateral shoulder-neck pain consults their GP for this complaint over a 2-year period. We have confirmed that severity and duration of symptoms as well as psychological distress are predictors of consultation. However, independently of these predictors, the outcome of consultation was not as good as in nonconsulters in terms of the persistence of shoulder-neck pain and disability. Although other characteristics of those who consult, including the underlying diagnosis, are likely finally to "explain" their persistence, consultation is not apparently altering the longterm outcome of the problem in those who choose to consult.

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