

The illness perceptions associated with health and behavioural outcomes in people with musculoskeletal hand problems: findings from the North Staffordshire Osteoarthritis Project (NorStOP)

S. Hill, K. Dziedzic, E. Thomas, S. R. Baker¹ and P. Croft

Objective. Illness perceptions may influence health outcomes, including pain. The objective of the study was to investigate the illness perceptions associated with health and behaviour in a population of older adults with musculoskeletal hand problems.

Methods. A two-stage cross-sectional postal survey was sent to individuals aged 50 yrs and over, registered with three general practices in North Staffordshire. Stage 1, a Health Survey questionnaire, was sent to 11 230 individuals and enquired about general health status, including anxiety and depression. Individuals reporting hand problems at Stage 1 were sent Stage 2, a detailed hand questionnaire. The hand questionnaire included: the Arthritis Impact Measurement Scales 2 (AIMS2) (hand and finger function, pain and medication scales), and questions on self-reported diagnoses and general practitioner (GP) consultation. Perceptions were measured by the Illness Perceptions Questionnaire-Revised (IPQ-R), and an item on perceived frustration with their hand problems. Of the 7878 responders to the Health Survey questionnaire 3749 (47.6%) reported 'hand problems' and 2695 (71.9%) gave permission to be re-contacted. The hand questionnaire was completed by 2113 (adjusted response rate 78.6%).

Results. A belief that their hand problem had a profound impact on life, caused a range of symptoms and made them frustrated were the perceptions most strongly and consistently associated with health and behaviour. There was little difference between individuals who did and those who did not report their hand problem to be osteoarthritis with respect to perceptions or between perceptions associated with health and behaviour.

Conclusions. The results suggest that older people who consider their musculoskeletal hand problem to have negative effects on their life will be more likely to encounter difficulties that may lead them to consult, take medication or both. Understanding the illness perceptions of these individuals may identify opportunities for intervention.

KEY WORDS: Population survey, Illness perceptions, Musculoskeletal.

Introduction

Osteoarthritis (OA) is a major cause of physical disability worldwide [1, 2], and the hand joints are among the most commonly affected sites along with the knee, spine and hips [3–5]. The symptoms experienced in hand OA may be substantial [6] and include pain and stiffness that can result in activity limitation [7].

There has been a realization in recent years that the impact of musculoskeletal conditions on an individual's life cannot be measured by disease indices such as radiographic change alone and that self-reported measures such as pain severity and limitation of daily activity provide important assessments of such conditions. A gap has become apparent between clinical and radiographic measures of disease severity or activity and the individual's experience of symptoms [8–10] and their impact on daily life and use of health care. One explanation may be the varying perceptions that people have about their joint problem, since perceptions about illness may influence health outcomes such as pain and disability directly [11–13] or indirectly by their effect on coping [14, 15]. One particular approach, known as the common-sense model of self-regulation or CSM [14], offers a way to understand this link, by setting it in the context of the processes by which individuals make sense of an illness experience—the 'lay experience'. For example, if a person considers that OA is a

serious progressive disease that medical care or the health services can do little about, this belief may have an impact on the level of interference in daily life from that disease that the person reports and on their decision to consult or seek treatment for it. One implication is that perceptions may be an important issue to address as part of reducing the impact of disease and encouraging appropriate management. There is evidence that intervening to change negative or mistaken perceptions can improve outcome in chronic heart disease for example [16].

As the first part of a long-term investigation into whether illness perceptions can influence outcome in joint problems in older people, we have conducted a cross-sectional survey of older people reporting musculoskeletal hand problems in a general population sample to establish whether illness perceptions are associated with current health status and use of health care. We have separately investigated whether, in those who report OA as the underlying diagnosis, these associations are different. Although cross-sectional studies cannot delineate cause and effect, they can give the first indication of potential associations. We separately investigated the hypothesis that a self-reported diagnosis of hand OA would be associated with worse illness perceptions, which in turn would be associated with worse function, pain and psychological outcomes, and greater use of health care and medication, when compared with individuals with other hand problems.

Methods

Design

The study method and design have been reported previously [17]. Briefly, the design of the study was a two-stage population-based cross-sectional postal survey. The study was part of a larger study of joint problems in older people—the North Staffordshire

Primary Care Musculoskeletal Research Centre, Primary Care Sciences, Keele University, Keele, Staffordshire ST5 5BG and ¹Department of Oral Health and Development, School of Clinical Dentistry, Claremont Crescent, University of Sheffield, Sheffield S10 2TA, UK.

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Correspondence to: S. Hill, Primary Care Musculoskeletal Research Centre, Keele University, Keele, Staffordshire ST5 5BG, UK.
E-mail: s.hill@cphc.keele.ac.uk

Osteoarthritis Project (NorStOP). The sampling frame consisted of all adults aged 50 yrs and over, registered with three urban general practices in North Staffordshire. Levels of health deprivation and disability for the catchment area surveyed are below the average for England and Wales, and 98% of the general adult population in North Staffordshire is Caucasian [18, 19]. The area is served by the North Staffordshire Rheumatology Centre, which provides a comprehensive rheumatology service in both secondary care and in the community. The general practitioners (GPs) checked the samples and a number of exclusions were made (for example, those with severe psychiatric or terminal illnesses).

Stage 1 collected socio-demographic information, and consisted of a Health Survey questionnaire measuring general health status, including anxiety and depression [Hospital Anxiety and Depression Scale (HADS)] [20]. The HADS consists of 14 items: seven for anxiety and seven for depression, each recorded on a four-point response scale (possible range of each dimension: 0–21) with high scores indicating higher levels of symptoms. Both subscales correspond well with psychiatric diagnosis [20]. The Health Survey questionnaire also asked about any problems in the past year in four specific joint areas, which enabled a population of individuals with a musculoskeletal hand problem to be identified. This population was mailed a second questionnaire (Stage 2, the Hand Survey), which enquired in detail about their hand problem and included measures of health perceptions.

Ethical approval for the study was obtained from the North Staffordshire Local Research Ethics Committee.

Procedure

The Health Survey questionnaire (Stage 1) was mailed to all eligible adults in the sampling frame ($n = 11\,230$). Non-responders were sent a reminder postcard after two weeks and after a further two weeks were sent a reminder letter and a further copy of the questionnaire. An overall adjusted response of 71.3% ($n = 7878$) was achieved. The socio-demographic and lifestyle characteristics of responders to the Health Survey questionnaire ($n = 7878$) have been reported previously [21]. Briefly, 56.1% of responders were female, and most were retired, with just over 25% in employment. Of those who were in employment, most were in semi-routine occupations [22, 23] and 99.9% were 'white' Caucasian, which is in keeping with other population research carried out in the North Staffordshire area [24].

Of the responders to Stage 1, 3749 (47.6%) reported 'hand problems'; these responders had slightly higher mean (s.d.) anxiety [7.78 (4.3) vs 6.03 (3.4), mean difference (95% confidence interval) 1.8 (1.6–2.0)] and depression [5.75 (3.87) vs 4.14 (3.5), 1.6 (1.4–1.8)] scores than responders without 'hand problems'. A total of 2695 (71.9%) of the Stage 1 responders with hand problems gave permission to be re-contacted and were sent the Stage 2 (Hand Survey) questionnaire. This questionnaire was completed and returned by 2113 adults (adjusted response 78.6%) who formed the study population for the main analyses described in this article. The study population were on average younger (mean age 65.4 yrs, s.d. 9.6) than those who reported hand problems but refused further contact ($n = 1054$) (mean age 70.1 yrs, s.d. 10.6).

Computer-assisted data entry was used and returned questionnaires were scanned [25]. Item responses and missing data were treated in accordance with published recommendations for each of the included instruments.

Hand questionnaire

The hand questionnaire included the Arthritis Impact Measurement Scales 2 (AIMS2) [26] for assessment of hand and finger function and pain and medication consumption. Consulting behaviour was assessed using an adapted version of the Knee Pain Screening Tool (KNEST) [27], a questionnaire that asks responders if they have consulted each of a number of health care professionals, including their GP, or if they have received

certain treatments both privately or on the NHS during the past 12 months. All scales were scored in accordance with authors' recommendations. Responders were also asked to give a self-reported diagnosis for their hand problem. A number of options were available, including: OA; rheumatoid arthritis (RA); 'other' and 'don't know'.

Illness perceptions were measured using the Illness Perceptions Questionnaire-Revised (IPQ-R) [28], a questionnaire that measures nine dimensions of lay illness perceptions made up of three parts: The first part measures identity and represents a person's belief about the illness label and the symptoms they are suffering and the perception of the link between the two.

The second part is made up of questions that cover five dimensions: timeline, which is made up of two subdimensions—acute/chronic and cyclical; consequences; cure/control, which is also made up of two subdimensions—personal control and treatment control; emotional representations; and illness coherence. Timeline represents the perceived likely course of their illness. Consequences describe perceived short- and long-term effects on physical, psychological and social functioning. Control/cure refers to the extent to which a condition is perceived to be amenable to personal or treatment control, or is curable. Emotional representations represent the emotions experienced as a result of their condition. Illness coherence reflects an individual's understanding of their condition. For each dimension, responders rate their level of agreement within each of the questions on a five-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'. High scores for these dimensions indicate, respectively, that the individual perceives that their hand problem will last a long time, it has a cyclical nature, it has a profound impact on their life, they perceive they have good personal or treatment control of their hand impairment, that their musculoskeletal hand problem affects them emotionally and that they have little understanding of it.

The final part is a list of 18 possible causes to which individuals attribute the cause of their condition and the degree to which the individual perceives him or herself as responsible for the illness, as well as the responsibility the individual takes for curing him or herself. Again, responders rate their level of agreement within each of the questions on a five-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'. The higher the score for each possible cause, the stronger the belief that it is responsible for their hand problem. For this questionnaire, researchers are able to substitute the term 'illness' with the name of the condition they are investigating. Illness was, therefore, changed to 'hand problem'.

The hand questionnaire also included a question: 'How often did your hand problems make you feel frustrated?' Response options were on a five-point verbal frequency scale: 'all days', 'most days', 'some days', 'few days' and 'no days'.

Reliability testing of the hand questionnaire

Reliability testing was carried out prior to the main study ($n = 88$). Intra-class correlations using a two-way random effects model [29] for the IPQ-R scales were acceptable [30], ranging from 0.61 (95% CI 0.46–0.73) for the illness coherence scale to 0.76 (95% CI 0.66–0.84) for the emotional representations scale, and those for the AIMS2 hand and finger function and pain scales were good [30], being 0.84 (95% CI 0.76–0.89) and 0.80 (95% CI 0.71–0.89), respectively. Test-retest on the AIMS2 medication scale and on GP consultation using linear weighted kappa [31] and Cohen's kappa [32], respectively, showed adequate and excellent agreement [30]. The CIs suggested a stable association between the same variables at both time points. Test-retest was carried out over a mean of 25 days (s.d. 8.5).

Internal consistency carried out on data from the main sample ($n = 2113$) was satisfactory [33, 34] with Cronbach's alpha for each of the scales of the IPQ-R ranging between 0.75 and 0.90.

Item–total correlation demonstrated acceptable or good internal reliability [35], with the majority of items well above 0.2. Cronbach's alpha for the AIMS2 hand and finger function and pain subscales were 0.92 and 0.86 respectively, and item–total correlations were all above 0.6 (Table 1).

This article reports the results of the findings from individuals with musculoskeletal hand problems who responded to Stage 2 of the study.

Statistical analysis

Age was stratified into three groups: 50–59 yrs ($n=674$), 60 to 69 yrs ($n=672$) and 70+ yrs ($n=651$). The mean and s.d. was calculated for the AIMS2 scales (hand and finger function and pain), the HADS, and each of the sub-scales of the IPQ-R. The questions on consultation, AIMS2 medication, frustration, and self-reported diagnosis were reported as frequency counts.

TABLE 1. Item–total correlation and Cronbach's alpha for items and dimensions of the IPQ-R and AIMS2 subscales ($n=2113$)

IPQ-R	Corrected item–total correlation	Alpha if item deleted
Timeline cyclical ($\alpha=0.84$)		
The symptoms of my hand problem change a great deal from day to day.	0.58	0.84
My symptoms come and go in cycles.	0.74	0.77
My hand problem is very unpredictable.	0.70	0.79
I go through cycles in which my hand problem gets better and worse.	0.69	0.79
Timeline acute/chronic ($\alpha=0.86$)		
My hand problem will last a short time. ^a	0.53	0.86
My hand problem is likely to be permanent rather than temporary.	0.70	0.82
My hand problem will last for a long time.	0.80	0.80
This hand problem will pass quickly. ^a	0.64	0.83
I expect to have this hand problem for the rest of my life.	0.67	0.83
My hand problem will improve in time. ^a	0.55	0.85
Consequences ($\alpha=0.85$)		
My hand problem is a serious condition.	0.63	0.83
My hand problem has major consequences on my life.	0.73	0.81
My hand problem does not have much effect on my life. ^a	0.48	0.81
My hand problem strongly affects the way others see me.	0.62	0.83
My hand problem has serious financial consequences.	0.66	0.82
My hand problem causes difficulties for those who are close to me.	0.81	0.81
Personal control ($\alpha=0.75$)		
There is a lot that I can do to control my hand symptoms.	0.45	0.73
What I do can determine whether my hand problem gets better or worse.	0.61	0.68
The course of my hand problem depends on me.	0.58	0.69
Nothing I do will affect my hand problem. ^a	0.36	0.75
I have the power to influence my hand problem.	0.56	0.70
My actions will have no effect on the outcome of my hand problem. ^a	0.40	0.74
Treatment control ($\alpha=0.77$)		
There is very little that can be done to improve my hand problem. ^a	0.39	0.78
My treatment will be effective in curing my hand problem.	0.58	0.71
The negative effects of my hand problem can be prevented (avoided) by my treatment.	0.62	0.69
My treatment can control my hand problem.	0.65	0.68
There is nothing that can help my hand problem. ^a	0.47	0.74
Emotional representations ($\alpha=0.89$)		
I get depressed when I think about my hand problem.	0.80	0.85
When I think about my hand problem I get upset.	0.82	0.85
My hand problem makes me feel angry.	0.74	0.86
My hand problem does not worry me. ^a	0.42	0.91
Having this hand problem makes me feel anxious.	0.75	0.86
My hand problem makes me feel afraid.	0.74	0.86
Illness coherence ($\alpha=0.90$)		
The symptoms of my hand problem are puzzling to me.	0.81	0.86
My hand problem is a mystery to me.	0.86	0.85
I don't understand my hand problem.	0.84	0.86
My hand problem doesn't make any sense to me.	0.74	0.88
I have a clear picture or understanding of my hand problem. ^a	0.52	0.93
Psychological attribution ($\alpha=0.79$)		
Stress or worry.	0.62	0.75
My mental attitude.	0.69	0.74
Family problems or worries.	0.70	0.74
Overwork.	0.29	0.86
My emotional state.	0.64	0.74
My personality.	0.55	0.76
Hand and finger function ($\alpha=0.92$)		
Could you easily write with a pen or pencil?	0.75	0.91
Could you easily button a shirt or blouse?	0.86	0.88
Could you easily turn a key in a lock?	0.85	0.89
Could you easily tie a knot or a bow?	0.87	0.88
Could you easily open a new jar of food?	0.67	0.93
Pain ($\alpha=0.86$)		
How would you describe the hand pain you usually had?	0.64	0.84
How often did you have severe pain in your hands?	0.77	0.80
How often did you have pain in two or more hand joints at the same time?	0.70	0.82
How often did the morning stiffness in your hands last for more than one hour from the time you woke up?	0.65	0.84
How often did your hand pain make it difficult for you to sleep?	0.64	0.84

^a Denotes items reverse scored.

TABLE 2. Mean and s.d. for scales—total hand population and self-reported hand osteoarthritis group

Illness Perceptions Questionnaire-Revised and outcome scales	Total hand population (n=2113)		Self-reported hand OA (n=538)		P-value
	n	Mean (s.d.)	n	Mean (s.d.)	
Timeline—cyclical (4–20)	1997	12.19 (3.5)	524	12.18 (3.6)	0.611
Acute/chronic (6–30)	2039	22.65 (4.7)	526	23.98 (4.2)	<0.0001
Consequences (6–30)	2038	14.21 (4.9)	525	15.24 (4.9)	0.208
Personal control (6–30)	2002	17.39 (4.0)	521	17.11 (3.8)	0.113
Treatment control (5–25)	1966	14.14 (3.3)	514	13.92 (3.1)	0.837
Emotional representations (6–30)	2005	14.18 (4.8)	524	14.13 (4.4)	0.176
Illness coherence (5–25)	1993	12.75 (4.2)	522	11.76 (3.7)	<0.0001
Psychological attribution (6–30)	1987	12.07 (3.8)	524	12.26 (3.6)	0.120
Identity (0–14)	1565	2.39 (2.1)	416	2.72 (2.0)	0.903
Hand and finger function (0–10)	2069	2.42 (2.5)	528	2.66 (2.5)	0.203
Pain (0–10)	2051	4.03 (2.5)	529	4.39 (2.4)	0.376
Anxiety (0–21)	2078	7.68 (4.3)	535	7.90 (4.4)	0.125
Depression (0–21)	2079	5.38 (3.7)	535	5.34 (3.7)	0.467

Possible range of scores in brackets.

In order to form a causal subscale, principal components analysis was carried out on the causal items within the IPQ-R.

Division of scales

Independent variables. These were the different dimensions of the IPQ-R and the single item on frustration. Those that were normally distributed were treated as continuous scales. Data for the identity and timeline scales were skewed, and were, therefore, divided into groups of similar size using a median split and grouped as 'low scores' or 'high scores'. The frustration item was dichotomized into those who experienced 'any' frustration and those who did not.

Dependent variables. These were the health status and health behaviour questions. AIMS2 items on hand and finger function and pain were skewed and were divided into groups of similar size using a median split. The AIMS2 medication scale and the GP consultation question were dichotomized as follows: those who took medication for their hand problem and those who did not, and those who had consulted their GP because of their hand problem in the past 12 months and those who had not. Data for the HADS anxiety and depression scales were also skewed; scores were split at seven (as advised by the original authors, seven or below indicating no anxiety or depression, scores above indicating mild, moderate and severe problems) [20].

Co-variables

Age, gender and self-reported diagnosis were treated as co-variables for the analyses of associations between perceptions and health status or behaviour.

To determine the association between illness perceptions and health status or behaviour, binary logistic regression was performed. Univariate analyses were performed separately looking at each independent and dependent variable. Multivariate analyses were carried out using the forced entry method [36]. Covariates were entered in two stages: (i) Adjusting for age-group, gender and self-reported diagnosis; (ii) Additionally adjusting for all other factors in the model. Odds ratios with 95% CI were also calculated. The level of significance was set at 0.05. Data were analysed for both the self-reported hand OA group and for the total hand population. As the identity scale includes pain, the principal symptom experienced by the respondents, this scale was excluded from analysis when investigating the dimensions of the IPQ-R in relation to pain.

Data were analysed using SPSS 12.0 [37]. Only statistically significant results are reported, that is, odds ratios with a CI that does not include one.

Results

A self-reported diagnosis of hand OA was reported by 538 responders (25.5% of all those with musculoskeletal hand problems). Mean scores for each of the IPQ-R dimensions are shown in Table 2. Mean count of hand symptoms on the identity scale was 2–3, similar in the subgroup reporting hand OA. Most responders perceived their hand problem to be chronic in nature. They also perceived more personal control than treatment control over their problem. Mean scores for both the total hand population and the self-reported hand OA group were similar across all dimensions of the IPQ-R. Frustration was reported on 'most days' or 'all days' by 22.4% of the total hand population, similar (24.2%) to the proportion in the subgroup reporting OA.

Table 2 also shows summary data for health status measures. Medication use, either 'every day' or 'on most days', was reported by 21.3%, and 21.8% had visited their GP over the preceding 12 months because of 'hand problems'. These figures were slightly higher in the subgroup reporting OA (29.8% and 24.2%, respectively).

Principal components analysis on the causal dimension of the IPQ-R revealed that 13 out of the 18 items loaded substantially on one component and accounted for just over 35% of the variance. The factor structure differed from that obtained by Moss-Morris and colleagues [28], who reported a four-factor structure accounting for 57% of the variance in a clinical population including people with a variety of medical conditions, for example RA and chronic pain. As recommended by the authors [28], a psychological attribution scale was formed by combining several of the causes into one scale. These items included: 'stress or worry', 'my mental attitude', 'family problems or worries', 'overwork', 'my emotional state' and 'my personality'.

Univariate and multivariate analyses of data from both the total hand population and the self-reported hand OA group were not appreciably different, therefore only results for the total hand population are presented.

Univariate analyses showed that most of the dimensions of the IPQ-R were associated with each outcome measure. The results are presented in Tables 3–5, where odds ratios are only shown for those factors that were significantly associated with the individual outcomes in the multivariate models.

Age, gender and self-reported diagnosis were associated with several health and behavioural outcomes. For example, an age of 70+ yrs was associated with reporting worse hand and finger function, as was female gender, and the 70+ group was less likely to consult their GP because of their hand problem. For self-reported diagnosis, both the 'other' and the 'don't know' groups reported less pain than the OA and RA groups and were also less

TABLE 3. Univariate and multifactorial analysis—illness perceptions associated with AIMS2 scales (total hand population)

Categories and IPQ-R scale			OR ^a (95% CI)	OR ^b (95% CI)	OR ^c (95% CI)
	AIMS2 hand/finger^l function (score 0–1.5)	AIMS2 hand/finger^l function (score 1.6–10)			
Male	466 (44%)	298 (29%)	1.00	1.00	1.00
Female	592 (56%)	713 (71%)	1.88 (1.57–2.26)	1.82 (1.49–2.23)	2.02 (1.50–2.73)
Age					
50–59	398 (38%)	286 (28%)	1.00	1.00	1.00
60–69	363 (34%)	332 (33%)	1.27 (1.03–1.57)	1.30 (1.03–1.65)	1.37 (0.98–1.91)
70+	297 (28%)	393 (39%)	1.84 (1.49–2.28)	1.84 (1.45–2.34)	2.04 (1.44–2.90)
OA	249 (47%)	279 (53%)	1.00	1.00	1.00
RA	177 (46%)	211 (54%)	1.06 (0.82–1.38)	1.10 (0.84–1.43)	1.24 (0.84–1.85)
Other	251 (54%)	213 (46%)	0.76 (0.59–0.97)	0.88 (0.68–1.15)	1.28 (0.88–1.89)
Don't know	267 (66%)	140 (34%)	0.47 (0.36–0.61)	0.51 (0.39–0.69)	0.92 (0.61–1.39)
Consequences ^h	1036	972	1.26 (1.23–1.29)	1.26 (1.22–1.29)	1.18 (1.14–1.23)
Identity					
Low score ^d	599 (75%)	264 (35%)	1.00	1.00	1.00
High score ^e	204 (25%)	480 (65%)	5.34 (4.29–6.64)	5.34 (4.19–6.81)	2.32 (1.73–3.12)
Frustration					
No days	642 (62%)	160 (16%)	1.00	1.00	1.00
Few days/all days	393 (38%)	828 (84%)	8.45 (6.85–10.44)	8.14 (6.42–10.26)	4.31 (3.17–5.86)
	AIMS2 pain (score 0–3.5)ⁱ	AIMS2 pain (score 3.51–10)^j			
Male	412 (39%)	353 (35%)	1.00	1.00	1.00
Female	639 (61%)	647 (65%)	1.18 (0.99–1.41)	1.03 (0.84–1.26)	0.89 (0.68–1.15)
Age					
50–59	385 (37%)	301 (30%)	1.00	1.00	1.00
60–69	351 (33%)	332 (33%)	1.21 (0.98–1.50)	1.09 (0.86–1.38)	1.01 (0.80–1.45)
70+	315 (30%)	367 (37%)	1.49 (1.20–1.84)	1.54 (1.22–1.95)	1.63 (1.20–2.21)
OA	234 (44%)	295 (56%)	1.00	1.00	1.00
RA	177 (46%)	206 (54%)	0.92 (0.71–1.20)	1.00 (0.74–1.35)	0.90 (0.64–1.27)
Other	265 (58%)	189 (42%)	0.57 (0.43–0.73)	0.62 (0.47–0.83)	0.59 (0.42–0.83)
Don't know	275 (68%)	132 (32%)	0.38 (0.29–0.49)	0.53 (0.39–0.72)	0.53 (0.37–0.76)
Timeline acute/chronic					
Low score ^f	778 (76%)	539 (56%)	1.00	1.00	1.00
High score ^g	246 (24%)	428 (44%)	2.51 (2.07–3.04)	2.36 (1.91–2.92)	1.41 (1.06–1.87)
Consequences ^h	1024	965	1.29 (1.25–1.32)	1.26 (1.23–1.30)	1.18 (1.13–1.22)
Frustration					
No days	656 (63%)	154 (15%)	1.00	1.00	1.00
Few days/all days	393 (37%)	840 (85%)	9.10 (7.36–11.26)	8.59 (6.81–10.83)	4.84 (3.70–6.34)

^aUnadjusted; ^badjusted for age/gender/perceived diagnoses; ^cadjusted for all other variables in table; ^dlow score (0–2); ^ehigh score (3–14); ^flow score (6–24); ^ghigh score (25–30); ^hcontinuous variable; median split: ⁱlow score; ^jhigh score.

likely to take medication. Those unsure of their diagnosis were also less likely to have consulted their GP over the preceding 12 months (Tables 3–5).

Illness perceptions associated with hand and finger function

The main illness perceptions associated with hand and finger function were frustration, identity and consequences. Those reporting worse hand and finger function were over four times more likely to report frustration because of their hand problem, nearly three times more likely to report three or more symptoms on the identity scale and had an increased odds of reporting more severe consequences (Table 3).

Illness perceptions associated with pain

Responders reporting more pain were approximately five times more likely to report frustration because of their hand problem, had an increased odds of reporting more severe consequences and were also more likely to report a chronic timeline for their problem compared to those with less severe pain (Table 3).

Illness perceptions associated with anxiety and depression

Those reporting higher anxiety and depression scores had an increased odds of perceiving a psychological attribution as a cause for their problem and increased odds of reporting frustration and emotional representations. Individuals reporting increased anxiety also had an increased odds of reporting three or more hand symptoms, but symptom reporting was not associated with depression (Table 4).

Illness perceptions associated with GP consultation and medication use

Self-reported GP consultation and self-reported medication consumption were both associated with similar illness perceptions about their hand problem. These perceptions included: reporting more severe consequences, the belief that treatment can control their hand problem or pain, frustration and the reporting of three or more symptoms. Perceiving a cyclical nature to their hand problem was also associated with medication consumption, while increased emotional representations was only associated with GP consultation (Table 5).

Discussion

This study investigated illness perceptions and their association with health outcomes in a population of adults aged 50 yrs and over with musculoskeletal hand problems registered with three urban general practices in North Staffordshire. We have shown strong associations between specific illness perceptions and different measures of health status such as hand and finger function, pain and psychological morbidity, and with health behaviours such as consultation and medication use. The strongest and most consistent associations with health status in the multivariate analyses were for the consequences and identity dimensions of the IPQ-R and the individual item relating to frustration. Although such a cross-sectional study cannot disentangle cause and effect, these findings underline the potential importance of health perceptions in relation to the impact of a chronic condition such as hand OA on the individual's daily functioning and their use of health care and treatment. Given the findings from other studies, which suggest that illness perceptions

TABLE 4. Univariate and multifactorial analysis—illness perceptions associated with anxiety and depression (total hand population)

Categories and IPQ-R scale			OR ^a (95% CI)	OR ^b (95% CI)	OR ^c (95% CI)
	HADS anxiety (score - 0–7)^h	HADS anxiety (score - 8–21)ⁱ			
Male	463 (44%)	311 (31%)	1.00	1.00	1.00
Female	599 (56%)	705 (69%)	1.75 (1.46–2.10)	1.75 (1.43–2.13)	1.62 (1.25–2.10)
Age					
50–59	316 (30%)	369 (36%)	1.00	1.00	1.00
60–69	353 (33%)	340 (34%)	0.83 (0.67–1.02)	0.75 (0.60–0.95)	0.73 (0.55–0.98)
70+	393 (37%)	307 (30%)	0.67 (0.54–0.83)	0.61 (0.48–0.77)	0.48 (0.35–0.66)
OA	266 (50%)	269 (50%)	1.00	1.00	1.00
RA	192 (50%)	192 (50%)	0.99 (0.76–1.29)	1.03 (0.79–1.34)	0.95 (0.67–1.34)
Other	263 (57%)	202 (43%)	0.76 (0.59–0.98)	0.79 (0.61–1.02)	0.99 (0.71–1.38)
Don't know	212 (52%)	197 (48%)	0.92 (0.71–1.19)	1.00 (0.77–1.30)	1.22 (0.85–1.74)
Emotional reps. ^{f,g}	1014	962 (49%)	1.15 (1.13–1.18)	1.15 (1.12–1.18)	1.07 (1.03–1.11)
Psychological attribution ^f	1010	950 (48%)	1.17 (1.14–1.20)	1.18 (1.14–1.21)	1.12 (1.07–1.16)
Frustration					
No days	522 (50%)	278 (28%)	1.00	1.00	1.00
Few days/all days	512 (50%)	714 (72%)	2.62 (2.18–3.15)	2.57 (2.10–3.14)	1.62 (1.23–2.13)
Identity					
Low score ^d	544 (68%)	318 (43%)	1.00	1.00	1.00
High score ^e	261 (32%)	426 (57%)	2.79 (2.27–3.43)	2.59 (2.07–3.23)	1.72 (1.31–2.25)
	HADS depression (score - 0–7)^h	HADS depression (score - 8–21)ⁱ			
Male	563 (37%)	211 (38%)	1.00	1.00	1.00
Female	966 (63%)	339 (62%)	0.94 (0.77–1.15)	0.93 (0.76–1.14)	0.82 (0.61–1.12)
Age					
50–59	503 (33%)	182(33%)	1.00	1.00	1.00
60–69	526 (34%)	167 (30%)	0.88 (0.67–1.12)	0.88 (0.69–1.12)	0.74 (0.53–1.04)
70+	500 (33%)	201 (37%)	1.11 (0.89–1.41)	1.11 (0.88–1.41)	0.83 (0.59–1.18)
OA	396 (74%)	139 (26%)	1.00	1.00	1.00
RA	286 (74%)	98 (26%)	0.98 (0.72–1.32)	0.96 (0.71–1.29)	0.80 (0.53–1.19)
Other	350 (75%)	115 (25%)	0.94 (0.70–1.25)	0.91 (0.68–1.22)	1.09 (0.74–1.60)
Don't know	315 (77%)	94 (23%)	0.85 (0.63–1.15)	0.83 (0.61–1.12)	0.90 (0.59–1.37)
Emotional reps. ^{f,g}	1460	516	1.16 (1.13–1.19)	1.16 (1.14–1.19)	1.10 (1.06–1.15)
Psychological attribution ^f	1455	505	1.15 (1.12–1.19)	1.15 (1.12–1.19)	1.10 (1.05–1.15)
Frustration					
No days	685 (46%)	115 (21%)	1.00	1.00	1.00
Few days/all days	803 (54%)	423 (79%)	3.14 (2.49–3.95)	3.16 (2.51–3.98)	1.49 (1.05–2.10)

^a Unadjusted; ^b adjusted for age/gender/perceived diagnosis; ^c adjusted for all other variables in table; ^d low score (0–2), ^e high score (3–14); ^f continuous variable; ^g emotional representations; Theoretical split; ^h low score (no anxiety/depression); ⁱ high score (mild, moderate, severe).

can play an important role in outcome [38, 39], our study raises the possibility that illness perceptions in a common disabling chronic condition such as OA may provide a potential target for intervention.

Illness perceptions are purported to be disease specific. The results showed that there was little difference between the illness perceptions of the whole population of older people reporting musculoskeletal hand problems and those within that group who self-reported a diagnosis of hand OA. There may be a number of reasons for this. Firstly, the study was carried out as a general population survey and has, therefore, included a very broad range of individuals. Past studies have involved clearly defined clinical populations. Secondly, the present study not only investigated disease groups but also a specific area, the hand; the perceived consequences of functional difficulties are likely to be the same in hand OA as they are in any hand condition.

The majority of older people with painful joints, including those with OA, do not consult their GP about it, despite often high levels of disability [40]. What our study highlights is that people's perceptions of their illness may be an important explanation of the variation in this behaviour. Individuals who perceive more severe consequences, perceive more symptoms and frustration as a result of their hand problem are more likely to consult their GP, take their medication, or both.

Pain or ache was one of the main symptoms linked to their hand problem and pain is an important motivator in seeking health care [41]. Illness identity of course may be a direct manifestation of disease severity. The link between health status and perceptions may arise because the more severe the condition the more likely that perceptions reflect this. However, negative perceptions may also influence the severity of symptoms and restricted function. In OA, however, there is often marked

discordance between subjective experience and objective measures of disease [42, 43] and variable perceptions might explain some of this gap. Identity was also related to functioning, in that those who reported more symptoms also reported worse hand and finger function. The importance of identity in explaining variance in functioning has been identified by other researchers across a range of conditions [11, 44]. For example, Scharloo and colleagues [44] investigated illness perceptions, coping and functioning using a short-structured interview involving patients with RA and found that identity and control/cure explained 35% of the variance in functioning, as measured by the Health Assessment Questionnaire [45]. Medical variables explained 6%.

The perception that treatment can control their hand problem was associated with self-reported GP consultation, and also self-reported medication use, in that those who perceived treatment to be able to control their hand problem were more likely to take medication. Medication use was also associated with the perception that their hand problem resulted in more severe consequences and the reporting of more symptoms. Both of these illness perceptions have been found to be associated with greater use of medication, as well as greater use of health care services, in a cross-sectional study of 100 community-based adults with asthma using the IPQ [46].

Although past studies have shown a relationship between personal control and functioning in patients with chronic pain [47], the present study failed to show this relationship. This may be related to the fact that the personal control scale of the IPQ-R does not distinguish between control of disease and control of symptoms. It may be more important to measure perceived control of symptoms in conditions where there is likely to be little or no perceived control over the disease *per se*.

TABLE 5. Univariate and multifactorial analysis—illness perceptions associated with GP consultation and medication use (total hand population)

Categories and IPQ-R scale	GP consultation		OR ^a (95% CI)	OR ^b (95% CI)	OR ^c (95% CI)
	No	Yes			
Male	609 (38%)	159 (35%)	1.00	1.00	1.00
Female	1001 (62%)	291 (65%)	1.11 (0.90–1.39)	1.07 (0.83–1.37)	0.89 (0.64–1.23)
Age					
50–59	507 (32%)	176 (39%)	1.00	1.00	1.00
60–69	535 (33%)	157 (35%)	0.85 (0.66–1.08)	0.71 (0.53–0.94)	0.81 (0.56–1.16)
70+	568 (35%)	117 (26%)	0.59 (0.46–0.77)	0.60 (0.45–0.80)	0.64 (0.43–0.95)
OA	405 (76%)	128 (24%)	1.00	1.00	1.00
RA	311 (81%)	74 (19%)	0.75 (0.55–1.04)	0.75 (0.54–1.04)	0.72 (0.47–1.11)
Other	352 (76%)	113 (24%)	1.02 (0.76–1.36)	0.96 (0.72–1.30)	1.14 (0.76–1.72)
Don't know	369 (90%)	42 (10%)	0.36 (0.25–0.53)	0.36 (0.24–0.52)	0.46 (0.28–0.77)
Timeline acute/chronic					
Low score ^f	1103 (70%)	228 (52%)	1.00	1.00	1.00
High score ^g	464 (30%)	210 (48%)	2.19 (1.76–2.72)	2.15 (1.68–2.74)	1.65 (1.17–2.34)
Consequences ^h	1566	440	1.16 (1.14–1.19)	1.17 (1.13–1.20)	1.09 (1.05–1.14)
Treatment control ^h	1514	425	1.00 (0.97–1.03)	1.02 (0.99–1.06)	1.17 (1.10–1.25)
Emotional reps. ^{h,i}	1541	433	1.16 (1.13–1.19)	1.17 (1.14–1.20)	1.09 (1.04–1.14)
Identity					
^d Low score	739 (61%)	122 (36%)	1.00	1.00	1.00
^e High score	464 (39%)	220 (64%)	2.87 (2.24–3.69)	3.08 (2.33–4.08)	1.50 (1.06–2.13)
	AIMS2 medication — no medication	AIMS2 medication — some medication			
Male	474 (41%)	292 (32%)	1.00	1.00	1.00
Female	674 (59%)	610 (68%)	1.47 (1.22–1.76)	1.34 (1.09–1.64)	1.09 (0.83–1.45)
Age					
50–59	386 (34%)	297 (33%)	1.00	1.00	1.00
60–69	366 (32%)	319 (35%)	1.13 (0.92–1.40)	1.06 (0.83–1.34)	1.11 (0.81–1.52)
70+	396 (34%)	286 (32%)	0.94 (0.76–1.16)	0.91 (0.71–1.15)	0.88 (0.63–1.23)
OA	239 (45%)	289 (55%)	1.00	1.00	1.00
RA	191 (50%)	191 (50%)	0.83 (0.64–1.08)	0.85 (0.65–1.10)	0.91 (0.63–1.32)
Other	289 (64%)	165 (36%)	0.47 (0.37–0.61)	0.50 (0.38–0.65)	0.51 (0.36–0.74)
Don't know	296 (73%)	112 (27%)	0.31 (0.24–0.41)	0.33 (0.25–0.44)	0.47 (0.32–0.69)
Timeline cyclical ^h	1093	861	1.03 (1.00–1.05)	1.03 (1.00–1.06)	1.05 (1.01–1.09)
Consequences ^h	1112	879	1.21 (1.17–1.23)	1.20 (1.17–1.23)	1.12 (1.08–1.16)
Treatment control ^h	1075	849	0.97 (0.94–1.00)	0.99 (0.96–1.02)	1.09 (1.04–1.15)
Emotional reps. ^{h,i}	1099	864	1.16 (1.13–1.18)	1.15 (1.12–1.18)	1.04 (1.00–1.08)
Illness coherence ^h	1094	857	0.98 (0.96–1.00)	1.01 (0.98–1.03)	0.95 (0.91–0.99)
Identity					
Low score ^d	623 (73%)	231 (34%)	1.00	1.00	1.00
High score ^e	232 (27%)	452 (66%)	5.25 (4.22–6.54)	4.89 (3.85–6.21)	2.52 (1.91–3.34)
Frustration					
No days	711 (45%)	85 (19%)	1.00	1.00	1.00
Few days/all days	865 (55%)	352 (81%)	3.40 (2.63–4.40)	3.81 (2.83–5.11)	1.91 (1.28–2.85)

^aUnadjusted; ^badjusted for age/gender/perceived diagnosis; ^cadjusted for all other variables in table; ^dlow score (0–2); ^ehigh score (3–14); ^flow score (6–24); ^ghigh score (25–30); ^hcontinuous variable; ⁱemotional representations.

Perceiving a psychological cause for their hand problem was associated with depression. It is feasible that those who perceive their illness as caused by factors such as 'personality' and 'emotional state' will report more psychological problems.

A potential limitation may have occurred if individuals were unable to complete the questionnaire because of their hand problem, excluding those more severely affected. Those who refused further participation in the study on completion of the Health Survey questionnaire and who indicated 'hand problems' over the preceding 12 months were on average older than the study population. Individuals aged 70 and over in the current study reported worse illness perceptions than the other age groups. The achieved response to the hand questionnaire was good however [48], and in keeping with other similar studies [49].

The study used self-reported diagnosis of OA as a method of subgrouping responders with hand problems. Kriegsman *et al.* [50] showed poor agreement when investigating the accuracy of self-reported diagnosis of OA and GP records, with males under-reporting and females over-reporting the condition. Discrepancies may also relate to recall errors by survey responders or under-recording by GPs [51]. March *et al.* [52] reported only moderate agreement between self-reported hand OA and those individuals satisfying the American College of Rheumatology (ACR) criteria for hand OA, and a study by O'Reilly *et al.* [53] found poor agreement between hand OA nodes identified on clinical examination and self-reported hand nodes. However, in our

study self-reported diagnosis was used to capture the participant's perception that they had a diagnosis of hand OA, rather than a clinical diagnosis.

The use of a cross-sectional design has important implications for the results and the inferences that can be made. In particular, the assumption of a direct causal link between illness perceptions and outcome cannot be made.

A drawback of the IPQ-R is that it is too cumbersome to be used in a clinical setting. A brief (9-item) version of the IPQ has recently been published by Broadbent *et al.* [54], although it has not been validated among people with hand OA or hand problems. A shortened version for use in clinical practice with people with musculoskeletal problems has, therefore, been developed from data from this study and other studies within the Primary Care Musculoskeletal Research Centre and is currently being evaluated in a follow-up of the responders. Further research is planned to evaluate whether illness perceptions change over time in this population.

Conclusions

We have established the IPQ-R is an instrument that can be used in a population sample, can be applied to the hand, has different dimensions that vary in their scores in different subgroups and also has the potential (with modification) to be applied in clinical practice. However, it has yet to be shown whether such

perceptions can be changed in this group of individuals, or whether they would provide a useful target for interventions or for the monitoring of progress over time in clinical practice. We have also shown that perceptions measured in a postal survey add useful descriptive data to measures of disease, health status and health care use. For a joint problem such as hand OA, we have shown clear associations between certain perceptions and both health status and health care use, which, although we have not established the direction of association, raise important questions about the possible role of perceptions in explaining the variation in severity and health care use in OA sufferers.

Rheumatology key message

- Illness perceptions including perceived consequences, symptoms and frustration have been found to be associated with health status and health care use.

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