Prevalence of self reported musculoskeletal diseases is high

H S J Picavet, J M W Hazes

Objectives: To present the prevalence of self reported musculoskeletal diseases, the coexistence of these diseases, the test-retest reliability with six months in between, and the association with musculoskeletal pain symptoms.

Methods: Twelve layman descriptions of common musculoskeletal diseases were part of the questionnaires of a prospective cohort study of a random sample in the general Dutch population aged 25 years or more (baseline: n=3664, follow up after six months: n=2338). Data collection also included information about pain relating to five different anatomical areas.

Results: Osteoarthritis of the knee (men 10.1%, women 13.6%) was amongst the most reported musculoskeletal diseases, whereas the figures for self reported rheumatoid arthritis (RA) were 1.6% and 4.6% for men and women, respectively. The coexistence of these diseases is high: 47% of the 66 combinations were reported more often than would be expected if they were independent of each other (p<0.05). For most diseases the test-retest reliability was good (κ between 0.6 and 0.8), but for repetitive strain injury (κ=0.37) and chronic arthritis other than RA (κ=0.44) the agreement was fair to moderate. All complaints of pain were more often reported by those with musculoskeletal diseases than those without those diseases, and the pain pattern was disease-specific.

Conclusions: Self reported musculoskeletal diseases are highly prevalent, with a fair to good reliability and a disease-specific pain pattern. Health surveys are a limited but valuable source of information for this group of health problems, which is not available from most other sources of information.

Musculoskeletal diseases are a major public health problem, but figures for the prevalence of most musculoskeletal disease are scarce, as was also mentioned in the framework for the Bone and Joint Decade 2000–2010. To describe the global burden of musculoskeletal conditions now and in the future is a central goal of the decade.

One method of gathering data on the prevalence of musculoskeletal conditions is by a population based survey asking questions on the existence of musculoskeletal diseases. Twelve layman descriptions of common musculoskeletal diseases were part of the questionnaires of a prospective cohort study of a random sample in the general Dutch population aged 25 years or more (baseline: n=3664, follow up after six months: n=2338). Data collection also included information about pain relating to five different anatomical areas.

RESULTS

To present the prevalence of self reported musculoskeletal diseases, the coexistence of these diseases, the test-retest reliability with six months in between, and the association with musculoskeletal pain symptoms.

METHODS

Data of the Dutch population based Musculoskeletal Complaints and Consequences Cohort study (DMC, study) were analysed.

Study population

The Dutch population in 1998 consisted of more than 15 million inhabitants, of whom more than 10 million were aged 25 years or more. A random sample of 8000 people aged >25, stratified by 10 year age group and sex (equal numbers in each age-sex band), was taken from the population register of 1998, identical to general surveys of Statistics Netherlands. Data on sex, age, address, and marital status were available from the population register. The address data on the 12 provinces were used to construct four national regions: north, west, east, and south.

The net response was calculated by dividing the number of respondents by the number of those approached, excluding those who had died or whose address was unknown (n=182). The net response of the DMC, study was 46.9% (n=3664). The response was slightly higher for women, for those in the middle age groups (45–64 years), and for those who were married (table 2).

People who signed an informed consent for follow up (n=2752) were approached after six months. Questionnaires with a baseline match on age and date of birth were assessed for 2338 (85%) respondents.

Questionnaire

For the baseline measurement we used a 28 page full-colour questionnaire that consisted of general questions and health
<table>
<thead>
<tr>
<th>Country, study, year of survey (reference)</th>
<th>Age group (years)</th>
<th>Number studied</th>
<th>Question on or description of musculoskeletal diseases</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada, HIS, 1978–79 (Lee 1985)2</td>
<td>Not specified</td>
<td>132337</td>
<td>Arthritis or rheumatism, and serious trouble with back or spine or other bones and joints</td>
<td>13.2 18.8 16.0</td>
</tr>
<tr>
<td>Canada, HALS, 1986–87 (Reynolds 1992)3</td>
<td>≥15</td>
<td>5.72</td>
<td>Five types of disabling musculoskeletal disease (arthritis, back trauma, bone) based on existing codes in the HALS data as developed by a team of rheumatologists, epidemiologists, and biostatisticians</td>
<td>2.75 3.75 4.76</td>
</tr>
<tr>
<td>Canada, Ontario Health Survey, 1990 (Badley 1994, 1993)45</td>
<td>≥16</td>
<td>45650</td>
<td>Arthritis or rheumatism, Serious trouble with back pain Other serious problems with the joints or bones</td>
<td>15.7 21.1 8.5</td>
</tr>
<tr>
<td>Canada, NHIS, 1994 (Wang 2000)6</td>
<td>≥20</td>
<td>39240</td>
<td>Do you have arthritis or rheumatism diagnosed by a health professional?</td>
<td>10.5 17.6</td>
</tr>
<tr>
<td>USA, HES, 1960–62 (Miles 1993)7</td>
<td>≥55</td>
<td>1551</td>
<td>Have you ever had any reason to think that you may have rheumatism or arthritis? Did a doctor tell you it was rheumatism or arthritis?</td>
<td>37.2</td>
</tr>
<tr>
<td>USA, NHANES II, 1976–1980 (Miles 1993)7</td>
<td>≥55</td>
<td>6846</td>
<td>Has a doctor ever told you that you had arthritis/gout?</td>
<td>44.3</td>
</tr>
<tr>
<td>USA, NHIS-SOA, 1984 (Miles 1993)7</td>
<td>18–64</td>
<td>14359</td>
<td>During the past 12 months, did you have arthritis? (among list of chronic conditions)</td>
<td>47.7</td>
</tr>
<tr>
<td>USA, Social Security Survey of Disability and Work, 1978 (Pincus 1987)7</td>
<td>18–64</td>
<td>5652</td>
<td>Arthritis/rheumatism Back stiffness Other back problems</td>
<td>11.3</td>
</tr>
<tr>
<td>USA, NHIS, 1989–91 (Helmick 1995)10</td>
<td>All</td>
<td>59289</td>
<td>Self reported arthritis and other rheumatic diseases according to ICD-9 codes recommended by the USA National Arthritis Data Workshop</td>
<td>11.7 18.0 15.0</td>
</tr>
<tr>
<td>USA, NHIS, 1994–95 (MMWR 2001)11</td>
<td>All</td>
<td>36057</td>
<td>Self reported arthritis and other rheumatic diseases according to ICD-9 codes recommended by the USA National Arthritis Data Workshop</td>
<td>12.5 19.5 16.1</td>
</tr>
<tr>
<td>USA, Health and Retirement Survey, 1992 (Helm 1992)12</td>
<td>51–61</td>
<td>8739</td>
<td>Arthritis or problems with the back or feet (among list of chronic conditions)</td>
<td>62.4</td>
</tr>
<tr>
<td>Finland, Mini-Finland Health Survey, 1978–80 (Heliovaara 1993)13</td>
<td>≥30</td>
<td>7217</td>
<td>Arthritis or problems with the back or feet only (no other chronic condition)</td>
<td>20.0</td>
</tr>
<tr>
<td>Scotland, Health Survey, 1993 (Cohen 1995)14</td>
<td>≥16</td>
<td>6212</td>
<td>Arthritis or painful joints</td>
<td>39.7</td>
</tr>
<tr>
<td>Norway, HIS, 1985 (Braage 1997)15</td>
<td>16–66</td>
<td>6681</td>
<td>Musculoskeletal disease (according to ICD-8 codes 710–738, 754–756, 787)</td>
<td>17.3 20.6 19.0</td>
</tr>
<tr>
<td>Norway, survey, year not specified (Gram 1997)16</td>
<td>Not specified</td>
<td>14420</td>
<td>Rheumatoid arthritis</td>
<td>1.6 1.6</td>
</tr>
<tr>
<td>The Netherlands, NHIS, 1989–92 (Picavet 1997)17</td>
<td>≥16</td>
<td>24191</td>
<td>Musculoskeletal conditions (arthritis, osteoarthritis, and severe back problems)</td>
<td>17.5</td>
</tr>
<tr>
<td>Australia (South), South Australian Health Omnibus Study, 1993 (Hill, 1999)18</td>
<td>≥15</td>
<td>3001</td>
<td>Have you ever been told by a doctor that you have arthritis? By type:</td>
<td>16.6 27.6 22.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rheumatoid arthritis</td>
<td>5.1 11.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Osteoarthritis</td>
<td>3.2 4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other or unspecified</td>
<td>8.3 10.8</td>
</tr>
</tbody>
</table>

HALS, Health and Activity Limitation Survey; NHIS, National Health Interview Survey; HANES, Health and Nutrition Examination Survey; HES for Health Examination Survey; SOA for Supplement Of Aging; NLTCS, National Long Term Care Surveys.
the disease should be suitable for self reporting. A description
more. For instance, ankylosing spondylitis was excluded; (95% CI)
numbers of diseases.
“check list method” produces higher and often more reliable
health surveys. A list of 12 diseases was included because the
the same form as lists of chronic diseases commonly used in

The list was preceded by an introductory text of the form: “There are many diseases of the
musculoskeletal system. Some are prevalent, some are rare. Please indicate whether a physician or medical specialist has
ever told you that you have one or more of the following
diseases.” Respondents were also asked whether they were
(still) receiving treatment for the particular disease. Criteria
for selection of the diseases were similar to general criteria for
health surveys lists of chronic diseases: (a) the disease
should not be too rare. Some cases should be expected to be
included in a survey of around 4000 people aged 25 years or
more. For instance, ankylosing spondylitis was excluded; (b)
the disease should be suitable for self reporting. A description
of the disease which is not purely medical should be available
or the disease should be expected to be well known among
laymen. For example we did not use not “epicondylitis” but
rather “tennis elbow” or “golfer’s elbow”. In the tables the
descriptions used are given, with the exception of epicondylitis,
RSI, osteoarthritis, osteoporosis and tendinitis or capsulitis.
Repetitive strain injury (RSI) also included, for example, “a
computer-arm”, osteoarthritis was also accompanied with
“wear and tear”. Besides osteoporosis we used also the
non-medical term on decalcification of bones, and for tendinitis
or capsulitis we used “inflammation or condition of tendon or
joint capsule”. In addition to the list of 12 diagnoses people
could report two extra musculoskeletal diseases in an open
question. Questions were asked on musculoskeletal pain in (a)
neck, shoulder or higher part of the back; (b) elbow or wrist/
hand; (c) lower part of the back; (d) hip or knee; (e) ankle and
foot. The question had the form: Have you had pain in <anatomical area> during the past 12 months? To analyse
generalised pain two different descriptions are used: definition
1 included those with pain in all areas, definition 2 included
those with pain in the lower back and at least one of the
upper extremities and lower extremities.

The follow up questionnaire was a slightly shorter version of
the baseline questionnaire (22 pages) and also included the
list of 12 layman descriptions of common diagnoses of
musculoskeletal diseases.

Statistical analysis
To present an estimation of the prevalences of the musculo-
skeletal diseases for the Dutch population, weighting factors
were used so that the distribution by age, sex, region, and
marital status was equal to that of the Netherlands of 1998
(direct standardisation). Confidence intervals were calculated
using the unweighted standard errors.

Whether or not the coexistence of musculoskeletal diseases
was higher than might be expected if they were independent
of each other was tested by Cochran-Mantel-Haenszel statistics
with adjustment for age.

Cohen’s $\kappa$ was calculated as a measure of agreement between
reporting of diseases at baseline and follow up. The following
ratings for the interpretation of $\kappa$ were used: poor ($\kappa < 0.20$), fair
($0.21 < \kappa < 0.40$), moderate ($0.41 < \kappa < 0.60$), good ($0.61 < \kappa < 0.80$),
very good ($0.81 < \kappa < 1.00$), according to Altman.

All analyses of data were performed using SAS version 6.12.

| Table 2 Description of the sample and respondents of the DMC3 study (%) |
|-----------------------------|-----------------------------|-----------------------------|
|                             | Sample (n=7818)              | Response (n=3664)            |
|                             | Not standardised             | Standardised*               |
| Sex                         |                             |                             |
| Men                         | 50.4                        | 44.8                        | 49.0                        |
| Women                       | 49.6                        | 55.2                        | 51.0                        |
| Age group                   |                             |                             |                             |
| 25–44                       | 32.3                        | 32.1                        | 47.0                        |
| 45–64                       | 34.7                        | 36.8                        | 34.6                        |
| 65+                         | 33.1                        | 31.1                        | 18.4                        |
| Marital status              |                             |                             |                             |
| Unmarried                   | 17.1                        | 13.0                        | 20.1                        |
| Married                     | 66.2                        | 71.7                        | 65.3                        |
| Widow                       | 9.7                         | 8.9                         | 6.9                         |
| Divorced                    | 7.0                         | 6.5                         | 7.7                         |
| Region of living            |                             |                             |                             |
| North                       | 11.2                        | 11.1                        | 10.6                        |
| West                        | 40.7                        | 39.6                        | 44.0                        |
| East                        | 22.6                        | 22.7                        | 20.7                        |
| South                       | 25.5                        | 26.7                        | 24.7                        |

*Respondents are weighted to represent a distribution of sex, age, marital status, and region of living equal to that of the Netherlands in 1998.

<table>
<thead>
<tr>
<th>Table 3 Prevalence of self reported musculoskeletal diseases (%) in the Dutch population, including 95% confidence interval, DMC3 study (standardised)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of disease</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Herniated disc of back</td>
</tr>
<tr>
<td>Gout</td>
</tr>
<tr>
<td>RSI</td>
</tr>
<tr>
<td>Epicondylitis</td>
</tr>
<tr>
<td>Osteoarthritis of knee</td>
</tr>
<tr>
<td>Osteoarthritis of hip</td>
</tr>
<tr>
<td>Osteoporosis</td>
</tr>
<tr>
<td>Whiplash</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
</tr>
<tr>
<td>Other chronic arthritis</td>
</tr>
<tr>
<td>Fibromyalgia</td>
</tr>
<tr>
<td>Tendinitis or capsulitis</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

*Excluding “other”.

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RESULTS

Table 3 presents the prevalence of musculoskeletal conditions. Of the Dutch population aged 25 years or more, 41% of the men and 48% of the women reported at least one musculoskeletal disease. The most commonly reported musculoskeletal diseases were “tendinitis or capsulitis” (15.4% of the men, 17.2% of the women) and “osteoarthritis of the knee” (10.1% of the men, 13.6% of the women).

With the exception of herniated disc of the back and gout, all diseases were more commonly reported by women than by men, especially osteoarthritis of the hip (3.9% of the men, 9.6% of the women) and osteoporosis (1.9% of the men, 9.9% of the women).

One fifth of the population reported a musculoskeletal condition that was not listed in the 12 descriptions. Most of these were (pain) complaints listed later in the questionnaire or fractures/accidents. Other mentioned diseases were osteoarthritis (19 times), sciatica (14), scoliosis (13), pelvis instability (8), herniated disc in the neck (8), ankylosing spondylitis (6), stroke (5), bursitis (5), Scheuermann’s disease (4), spondylitis, and some neurological diseases like chronic polyneuropathy (3), myasthenia gravis (2), and Ménière’s disease (2). Once only were mentioned, for instance, polymyalgia rheumatica, Dupuytren’s disease, hammer toe, psoriatic arthritis, Tietze’s syndrome, and Paget’s disease.

The prevalence of the following diseases increased with increasing age (fig 1): gout, knee osteoarthritis, hip osteoarthritis, osteoporosis, RA, and other chronic arthritis; these are the age related diseases. The prevalence of RSI, whiplash and fibromyalgia seemed to be independent of age, and for herniated disc of the back, epicondylitis and tendinitis, or capsulitis an inverse U-shape with age was found; these are age dependent diseases.

On average, half of those reporting a musculoskeletal disease were (still) receiving treatment for the disease (table 3). Among women, this percentage varied from 36.8% for those reporting gout to 66.5% for the patients with fibromyalgia. Among men, the number reporting medical treatment varied from to 35.7% for osteoarthritis to 100% for fibromyalgia.

The number reporting more than one musculoskeletal disease was high: 15.3% of the men and 22.2% of the women reported more than one musculoskeletal disease. The combinations of specific diseases that were reported by more than 3% of the population (table 4) were: epicondylitis and tendinitis or capsulitis (4.2%), osteoarthritis of knee with osteoarthritis of hip (5.3%), osteoarthritis of knee with osteoporosis (3.6%), osteoarthritis of knee with tendinitis or capsulitis (3.6%), and osteoarthritis of hip with osteoporosis (3.0%). Forty seven of the 66 combinations of the musculoskeletal diseases were reported more often than might be expected if they were independent of each other (p<0.05).

For eight out of 12 diseases the test-retest reliability was good (κ between 0.6 and 0.8), but especially for RSI (κ=0.37) and chronic arthritis other than RA (κ=0.44) the agreement was only fair to moderate (table 5).

All complaints of pain were reported more commonly by those with musculoskeletal disease than by those without musculoskeletal disease (table 6). Patients with fibromyalgia reported the highest pain prevalences. For the other diseases pain patterns were disease-specific: pain of neck, shoulder or higher back was most commonly reported by those reporting whiplash (OR=8.9, 95% CI 4.6 to 17.3); pain of elbow or wrist/hand by those with rheumatoid arthritis (RA) (OR=5.9, 95% CI 4.2 to 8.3), other arthritis (OR=5.1, 95% CI 3.6 to 7.1), and RSI (OR=4.7, 95% CI 2.8 to 7.8); low back pain in
reported musculoskeletal diseases, a high coexistence of these diseases, and a disease-specific pattern of associations with complaints of pain.

About half of the study population reported at least one musculoskeletal disease, which is high compared with self-reported prevalences of musculoskeletal conditions in other population-based surveys. This is mainly due to differences in study design. For all specific musculoskeletal diseases, we also found higher prevalences then formerly reported. However, most prevalence studies on specific diseases were based on medical registries or physical examination. We will briefly describe the prevalence of the specific diseases.

### Specific musculoskeletal diseases

#### Herniated disc

In one of the scarce population studies of herniated disc the prevalence found was 5.1% of the men and 3.7% of the women, which was based on medical history, symptoms, and standardised physical examination in a Finnish population aged 30 years or more. Our prevalences were almost double: 10.3% and 8.3% for men and women, respectively.

#### Gout

A prevalence study of gout in England using general practitioner registers showed a prevalence of around 1%, higher among men than among women. This figure is similar to self-reported prevalence in studies in the USA, but our data show much higher figures with 3.7% among men and 2.3% among women.

#### RSI, epicondylitis, or tendinitis/capsulitis

We could not find any population prevalence studies on RSI, epicondylitis, or tendinitis/capsulitis. Only studies relating to

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**Table 4** Prevalence of coexisting musculoskeletal diseases (%) in the Dutch population, DMC3 study

|                    | B   | C   | D   | E   | F   | G   | H   | I   | J   | K   | L   |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A Herniated disc of back | 0.6 | 0.2 | 1.5* | 2.1* | 1.4 | 1.3* | 0.3 | 0.6 | 0.6 | 0.2 | 2.0* |
| B Gout             | 0.1* | 0.8 | 1.1* | 0.7* | 0.7* | 0.2* | 0.6* | 0.3 | 0.1* | 1.2* |
| C RSI              | 0.7* | 0.5* | 0.2 | 0.1 | 0.1* | 0.2* | 0.1 | 0.1 | 0.9* |
| D Epicondylitis    | 2.5* | 1.2 | 1.0 | 0.4 | 0.6* | 0.9* | 0.3* | 4.2* |
| E Osteoarthritis of knee | 5.3* | 3.6* | 0.6* | 2.2* | 2.0* | 0.3* | 3.6* |
| F Osteoarthritis of hip | 3.0* | 0.3 | 1.5* | 1.1* | 0.3* | 2.0* |
| G Septic arthritis  | 0.3* | 1.4* | 1.2* | 0.4* | 1.8* |
| H Rheumatoid arthritis | 1.4* | 0.2* | 0.1* | 0.5 |
| I Other chronic arthritis | 0.3* | 1.4* |
| J Fibromyalgia      | 0.5* |

*The coexistence of the two diseases is higher than expected on the basis of independence (p<0.05).*

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**Table 5** Consistency in reporting musculoskeletal diseases—DMC study

<table>
<thead>
<tr>
<th></th>
<th>People still reporting disease after 4 months (%)</th>
<th>k Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniated disc of back</td>
<td>73.0</td>
<td>0.74</td>
</tr>
<tr>
<td>Gout</td>
<td>64.0</td>
<td>0.64</td>
</tr>
<tr>
<td>RSI</td>
<td>42.5</td>
<td>0.37</td>
</tr>
<tr>
<td>Epicondylitis</td>
<td>66.0</td>
<td>0.64</td>
</tr>
<tr>
<td>Osteoarthritis of knee</td>
<td>77.1</td>
<td>0.66</td>
</tr>
<tr>
<td>Osteoarthritis of hip</td>
<td>67.5</td>
<td>0.62</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>64.6</td>
<td>0.64</td>
</tr>
<tr>
<td>Whiplash</td>
<td>70.9</td>
<td>0.73</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>56.7</td>
<td>0.52</td>
</tr>
<tr>
<td>Other chronic arthritis</td>
<td>47.4</td>
<td>0.44</td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>67.7</td>
<td>0.65</td>
</tr>
<tr>
<td>Tendinitis or capsulitis</td>
<td>60.4</td>
<td>0.50</td>
</tr>
</tbody>
</table>

---

**Table 6** Musculoskeletal pain reported by people with and without musculoskeletal diseases, DMC, study, ORs and 95% confidence intervals

<table>
<thead>
<tr>
<th>Pain of</th>
<th>Neck, shoulder, or higher back</th>
<th>Elbow or wrist/hand</th>
<th>Lower back</th>
<th>Hip or knee</th>
<th>Ankle or foot</th>
<th>Generalised pain definition 1</th>
<th>Generalised pain definition 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniated disc of back</td>
<td>1.6</td>
<td>[1.3 to 2.0]</td>
<td>1.3</td>
<td>[1.0 to 1.6]</td>
<td>6.3</td>
<td>[4.8 to 8.2]</td>
<td>1.4</td>
</tr>
<tr>
<td>Gout</td>
<td>1.6</td>
<td>[1.2 to 2.3]</td>
<td>1.9</td>
<td>[1.3 to 2.7]</td>
<td>1.8</td>
<td>[1.3 to 2.5]</td>
<td>1.9</td>
</tr>
<tr>
<td>RSI</td>
<td>3.4</td>
<td>[2.0 to 6.0]</td>
<td>4.7</td>
<td>[2.8 to 7.8]</td>
<td>1.2</td>
<td>[0.7 to 1.9]</td>
<td>1.3</td>
</tr>
<tr>
<td>Epicondylitis</td>
<td>1.8</td>
<td>[1.5 to 2.3]</td>
<td>3.4</td>
<td>[2.6 to 4.2]</td>
<td>1.4</td>
<td>[1.1 to 1.7]</td>
<td>1.4</td>
</tr>
<tr>
<td>Osteoarthritis of knee</td>
<td>1.9</td>
<td>[1.5 to 2.2]</td>
<td>2.8</td>
<td>[2.4 to 3.4]</td>
<td>1.6</td>
<td>[1.3 to 1.9]</td>
<td>1.2</td>
</tr>
<tr>
<td>Osteoarthritis of hip</td>
<td>1.8</td>
<td>[1.4 to 2.3]</td>
<td>2.0</td>
<td>[1.6 to 2.5]</td>
<td>2.1</td>
<td>[1.7 to 2.7]</td>
<td>1.1</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>2.6</td>
<td>[2.0 to 3.3]</td>
<td>2.3</td>
<td>[1.8 to 3.0]</td>
<td>2.5</td>
<td>[2.0 to 3.3]</td>
<td>3.2</td>
</tr>
<tr>
<td>Whiplash</td>
<td>8.9</td>
<td>[6.6 to 17.3]</td>
<td>2.1</td>
<td>[1.3 to 3.3]</td>
<td>2.1</td>
<td>[1.3 to 3.4]</td>
<td>1.9</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>2.7</td>
<td>[1.9 to 3.7]</td>
<td>5.9</td>
<td>[4.2 to 8.3]</td>
<td>1.6</td>
<td>[1.1 to 2.2]</td>
<td>3.7</td>
</tr>
<tr>
<td>Other chronic arthritis</td>
<td>2.9</td>
<td>[2.0 to 4.1]</td>
<td>5.1</td>
<td>[3.6 to 7.1]</td>
<td>2.4</td>
<td>[1.7 to 3.4]</td>
<td>3.8</td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>16.7</td>
<td>[9.2 to 54.8]</td>
<td>9.6</td>
<td>[4.8 to 19.0]</td>
<td>3.5</td>
<td>[1.8 to 6.9]</td>
<td>6.9</td>
</tr>
<tr>
<td>Tendinitis or capsulitis</td>
<td>3.1</td>
<td>[2.5 to 3.7]</td>
<td>2.7</td>
<td>[2.3 to 3.3]</td>
<td>1.9</td>
<td>[1.6 to 2.3]</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Self reported musculoskeletal diseases

specific professions are available, but they are not representa-
tive of the general population. For RSI sometimes a broad
definition is used such as “complaints of upper extremities”
and then high prevalences up to 41% of the working popula-
tion are mentioned. The same is true for shoulder
complaints, which can include tendinitis (for example, rotator
cuff tendinitis) or capsulitis. Estimations of lateral epi-
condylitis (“tennis elbow”) are between 1% and 3%, but we
found much higher prevalences of around 10% including
medial epicondylitis (“golfers’ elbow”).

Osteoporosis
We had no idea how many of the population would consider
themselves as having osteoporosis because for the general
public in the Netherlands it is a relatively new medical con-
dition. In the past 10–15 years it has been brought to the public
attention by, for example, the food industry (“milk rich in cal-
cium for strong bones”). The self reported prevalences of
osteoporosis (1.9% for men and 9.9% for women) are high and
much higher than the 0.1% and 0.3% for men and women,
respectively, estimated by general practitioner registries. A
Dutch population study of people aged 55 years or more
showed prevalences of osteoporosis as defined by bone
mineral density measures of 5.2% among men and 16.5% among
women. If we limit our data to those aged 55 years or
more we find the following prevalences: 3.6% for men and
25.6% for women.

Whiplash
Persistent neck pain and associated complaints after a motor
vehicle crash or a comparable situation, is often referred to as
whiplash injury or whiplash syndrome. The self reported
prevalences were 1.6% among men and 2.6% among women,
which is higher than the 0.07% and 0.13% estimated for
Canadian men and women who regularly drive in cars. The
suggested association between whiplash and fibromyalgia was
not confirmed in our study: the prevalence of the combi-
nation of both diseases was no higher than might be expected
if they were independent of each other.

Fibromyalgia
Of our list of musculoskeletal diseases, fibromyalgia is the one
least mentioned: it is reported by 0.2% of the men and 2.1% of
the women. An American study reported a prevalence of 0.5%
among men and 3.4% among women according to American
College of Rheumatology classification criteria.

Osteoarthritis
Osteoarthritis can be clinically defined, radiographically
defined or symptomatic and prevalences are highly dependent
on the definition used. The prevalence of knee osteoarthritis is
usually higher than that of hip osteoarthritis and we found
the same: knee osteoarthritis was reported by 10.1% of the
men and 13.6% of the women and the figures for hip
osteoarthritis were 3.9% and 9.6%, respectively.

[Rheumatoid] arthritis
Also for RA we found higher prevalences than found by studies
based on registries or physical examination: 1.6% (men) and
4.6% (women). Population studies show prevalences of around
0.7% for men and 1.6% for women. Estimates of other forms of chronic arthritis are around 1%, also lower than
the prevalences we found. Several estimates of self reported arthritis are available for the USA (see table 1 and Lawrence et al)—as high as 16.1% of the total American population.

“Arthritis” is thought to include osteoarthritis, RA and all
other forms of arthritis. In the Netherlands we do not have a
similar word that combines these diseases. If we group these
diseases the calculated prevalence is 17.6% of the population
aged ≥25 years, which is similar to the USA figures (which included the population <25 years).

Although the absolute prevalence of most musculoskeletal
diseases differs substantially between studies, and the self
reporting surveys show the highest prevalence, the pattern of
prevalence in men and women is often similar. A higher
prevalence of herniated disc of the back and gout is found in
men, whereas for most other musculoskeletal diseases the
prevalence is higher among women than among men.

Measurement issues
Comparability of prevalences from different studies is of
course limited owing to several methodological and cultural
differences. The use of a checklist of musculoskeletal diseases
was, for instance, expected to produce higher prevalences than
studies based on a open or more generally worded description
of musculoskeletal disease. Musculoskeletal diseases are a
heterogeneous group of conditions, the most prevalent of
which have ill defined case definitions. The description
and meaning of different musculoskeletal diseases will differ
between medical specialists, between medical specialists and
the general public, and also between cultures and languages.
The layman’s interpretation of terms like arthritis and
rheumatism, for instance, is in the Netherlands completely
different from American interpretations, which results in
highly different prevalences. In a survey of several studies it
has been shown that RA is a commonly misused diagnosis.

In general, the validity of the self reporting of musculoskeletal
conditions can be seen to be poor when the figures are
compared with registrations or physical examination. The
limitations in measurement of musculoskeletal diseases
by self reports is also shown by the test-retest reliability,
which is only fair to good. It might be questioned whether the
agreement between two measurements with six months in
between can be viewed as a test-retest reliability measure,
because people may recover from disease or may be newly
diagnosed. However, we think that most of these diseases
studied are of long duration or chronic. The agreement found
for most diseases (κ values between 0.6 and 0.8) was much
better than that found in a Finnish study, which reported κ
values from 0.1 to 0.5 for musculoskeletal diseases. In that
Finnish study the validity of self reported musculoskeletal
diseases was also examined, with diagnosis based on a physi-
cal examination as the “gold standard”. Both the sensitivity
(S) and positive predictive value (PPV) were rather weak for
all musculoskeletal diseases measured: (possible) inflamma-
tory polyarthritis (S=51.1%, PPV=61.4%), osteoarthritis
(S=34.4%, PPV=52.9%), low back disorder (S=55.6%,
PPV=44.1%), neck-shoulder disorder (S=23.8%,
PPV=63.7%). Typically, the prevalence of the musculoskeletal
disease of this Finnish study was higher when based on
physical examination than when based on interview. We, and
most other surveys, found much higher prevalences of
musculoskeletal diseases from self reporting than when
estimated from physical examinations or registrations. This
discrepancy may be due to cultural differences or the method
of self reporting.

When interpreting the results of the DMC study the possible
limitation of selective non-response should be taken into
account. Because the DMC, study was introduced to respond-
ents as a general health survey focusing on musculoskeletal
health problems it is possible that people with musculo-
skeletal health problems were more willing to participate than
those without those problems. Therefore a slight overestima-
tion of self reported musculoskeletal diseases can be expected.
In addition, this might have contributed to the high
prevalence of coexistent musculoskeletal diseases. Respond-
ents and non-respondents did not differ in other characteris-
tics, such as sociodemographic factors.

The assessment of disease information from self reports is
limited owing to undiagnosed diseases and false diagnoses,
and because the patient misunderstands the diagnosis, forgets
it, or is unwilling to report it. The high prevalences of self reported diseases found suggest that many respondents report a false diagnosis. Do they really try to fool us? Or are there a lot of hypochondriacs who think every musculoskeletal pain (see the high association with pain) is a diagnosed disease?

For the assessment of diseases that are characterised by pain and functional limitation, it is often agreed that the individual subject is our single best source of information. In addition, to establish the prevalence of arthritis in the population, the consensus of a working group of experts was that “symptomatic arthritis rather than radiographic evidence of arthritis should be used to measure prevalence. Symptomatic includes both self reported arthritis as well as reported pain in the joints” 13

Public health
Because musculoskeletal health problems present such a public health burden they should be routinely assessed in (national) health surveys. In most European countries this is not the case. The self reporting of musculoskeletal diseases provides information of “a musculoskeletal health problem” as also shown by the high associations with musculoskeletal pain. What this “musculoskeletal health problem” means for clinical diagnosis is still unclear, and this will also differ in each country, language, or culture.

In addition to the importance of determining the prevalence of musculoskeletal conditions, the inclusion of musculoskeletal conditions in (national) health surveys is also needed for an analysis of their association with lifestyle factors (such as physical activity patterns) and to study their impact on (work) disability and the use of health services. This type of information provide insight into the possibilities of prevention and into the way in which the general public view and describe musculoskeletal health problems. One question is: should the public be educated about the nature of musculoskeletal diseases and how to live with them?

In conclusion, musculoskeletal diseases are highly prevalent in the population, especially according to self reports. The fair to good test-retest reliability of self reported musculoskeletal conditions in (national) health surveys is also needed for its association with lifestyle factors (such as physical activity patterns) and to study their impact on (work) disability and the use of health services. This type of information provide insight into the possibilities of prevention and into the way in which the general public view and describe musculoskeletal health problems. One question is: should the public be educated about the nature of musculoskeletal diseases and how to live with them?

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