

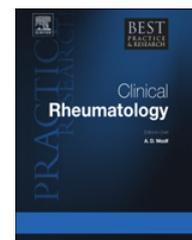


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Epidemiology of chronic musculoskeletal pain

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Chronic widespread pain (CWP) due to musculoskeletal conditions is a major social burden. The case definition of CWP relies on pain, chronicity (more than 3 months' duration) and widespread distribution (both sides of the body including the axial skeleton). Health Interview Survey (HIS) and Health Examination Survey (HES) have been used to assess the frequency of CWP in the general population. Unfortunately, both techniques are poorly standardised, which hampers comparison of data pertaining to different populations and countries. A major effort in the European Union (EU) is the development of common strategies to investigate musculoskeletal pain through HIS. Issues to be addressed include: (1) loss of daily life functions due to pain; (2) pain duration and rhythm; (3) affected sites; and (4) type of pain. We know that musculoskeletal pain affects between 13.5% and 47% of the general population, with CWP prevalence varying between 11.4% and 24%. Risk factors for musculoskeletal pain include age, gender, smoking, low education, low physical activity, poor social interaction, low family income, depression, anxiety and sleep disorders, as well as performing manual work, being a recent immigrant, non-Caucasian and widowed, separated or divorced.

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Epidemiological definition of chronic widespread pain

Musculoskeletal conditions usually present with pain and loss of function. The patient complains of chronic musculoskeletal pain, which could be due to a number of different illnesses. The real frequency

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of the original musculoskeletal conditions, as a result, is difficult to assess because it is marred by case-definition uncertainties and differences in the methods adopted in the epidemiological studies [1]. Pain, an important symptom of joint diseases, is also an index of severity and activity of the underlying condition, as well as a prognostic/therapeutic indicator and a determinant of health-resources use. The three clinical features of the condition that constitute the topic of this article are pain, chronicity and widespread localisation. The definition of pain, according to sources such as the International Association for the Study of Pain (IASP) and World Health Organization (WHO), has been already addressed in this issue of *Best Practice Clinical Rheumatology* [2]. IASP defined pain as “an unpleasant sensory and emotional experience associated with actual or potential damage or described in terms of such damage” [3]. According to the American College of Rheumatology (ACR) 1990 criteria, chronic widespread pain (CWP) is defined as pain that is bilateral, above and below the waist, in the axial skeleton and lasts for at least 3 months [4]. This definition was used for developing the diagnostic criteria of fibromyalgia. Hunt et al. proposed a slightly different definition of CWP, describing it as pain that has been present for at least 3 months in at least two sections of two contralateral limbs and in the axial skeleton [5]. This definition can identify also people with CWP related to fatigue, distress and psychological problems. Generally, pain caused by malignant, metabolic or infectious disorders is not included in CWP. In summary, pain should last at least 3 months to be considered chronic and should be localised simultaneously both in the axial and peripheral skeleton, affecting both parts of the body. These definitions, however, cannot discriminate between pain directly localised in the joints or bones and pain originating from the surrounding tissues, such as ligaments, tendons and tendon sheaths, fasciae, muscles and bursae. For the sake of epidemiological studies, this differentiation is unnecessary because musculoskeletal pain at large is investigated.

What to measure?

The goal of descriptive epidemiology is the measure of occurrence of a given disease. In our case, the number of patients affected by musculoskeletal conditions, both in terms of percentage of the general population (prevalence) and of new cases of the disease developing in a given time frame (incidence), is investigated. By convention, the usual time interval for expressing incidence is 1 year and the source population is considered to be 100,000 subjects. However, according to the disease and the scope of the investigation, both time and population dimensions can vary. The reference time can comprise between few months, 6 months, 1 year, and ever; in rare diseases, which is not the case with musculoskeletal pain, the reference population can be increased to 1,000,000 people. Data obtained by descriptive epidemiology can be used to calculate the impact of a given disease on society and the health system, to help practicing physicians in their diagnostic decisions and to infer causal relationships in the pathogenic mechanisms [6].

Which methods to investigate pain?

To collect data from a population, two main methods are used: Health Interview Survey (HIS) and Health Examination Survey (HES) [7]. HIS is based on face-to-face, phone or postal questionnaires focussed on the main aspects of pain and of the underlying diseases. In a slightly more sophisticated procedure, subjects identified by their answers to the questionnaire as possible patients are subsequently invited to attend the clinic for a complete evaluation. The HES is based on the direct examination of the complete population. The first approach is simpler, cheaper and faster, but shows several limitations. In the setting of musculoskeletal diseases, people are often unable to discriminate between pain or swelling originated in or around the joint because of a rheumatic condition and other situations such as peripheral oedema or referred pain from other organs. For example, in a previous study from our group on the prevalence of rheumatoid arthritis in Italy, a preliminary questionnaire included questions on peripheral joints' swelling and pain [8]. Among others, the patients complaining of swelling and pain in the ankles were invited to the outpatient clinic because they fulfilled the minimum criterion of one pair of involved joints. However, the vast majority of them had peripheral oedema related to venous or cardiac insufficiency, but not ankle arthritis [9]. Other problems include the specific diagnosis and the issue of disease duration, as it is extremely difficult to determine the real

start of a chronic condition even during a face-to-face interview with the patient. Therefore, the rough period of time lived with pain can be asked rather than its precise beginning date.

Different methods have been used across the world, making comparison of HIS results extremely difficult. Questions on pain are included in a number of questionnaires commonly used in epidemiological studies. The different characteristics of some of them are shown in [Table 1](#). The presence of questions regarding pain, its type, intensity and localisation has been analysed. [Table 1](#) also indicates how often the method has been used in the general medical literature and, in particular, in articles regarding the musculoskeletal system. These data have been obtained through a Medline search and should be considered only as indicative. Another limitation is that the specificity of the results of questionnaires is low, and they cannot substitute health examinations to define diagnoses [10], as will be discussed in the next paragraph. In addition, pain is not always part of the question panel in HIS. A selection of HIS where pain was investigated is shown in [Table 2](#). Recently, the European Union (EU) promoted the collection of health data in the participating countries (Regulation (EC) No. 1338/2008 of the European Parliament and of the Council of 16 December 2008 on Community statistics on public health and health and safety at work). This European Health Interview Survey (EHIS) has until now evaluated three areas: mental health, physical activity and alcohol consumption. The European Musculoskeletal Surveillance and Information Network (EUMUSC), an EU-supported network with the aim of evaluating the epidemiology and impact of musculoskeletal conditions (eumusc.net), has been asked to develop new questions concerning musculoskeletal health to be added to EHIS. Accordingly, the same questions developed by experts in this field will be administered simultaneously in the European countries, allowing, for the first time, international comparisons of the results.

Which questions?

Diseases associated with pain have a number of characteristics that can be investigated through questionnaires ([Table 3](#)). However, none of the questionnaires described in the previous paragraph has been specifically designed to assess musculoskeletal conditions. As a result, the information available for the rheumatologist is scarce. Designing a musculoskeletal conditions-oriented questionnaire could improve the knowledge of these conditions, but which questions should be included?

A first issue is whether not only questions related to pain itself but also to the specific physician-reported diagnosis should be included in an interview regarding pain. Having both pieces of information would be of value. However, the most relevant limiting factor is that the majority of patients with pain do not see a doctor for their complaints. This fact can be easily understood if the pain is of minor severity and does not interfere with function and work ability. However, even when pain is conspicuous, many patients rely on patience or self-medication. This may be due to the cultural belief that pain itself is a consequence of life, and not worth medical attention. Another possibility is that musculoskeletal pain is seen as an age-associated phenomenon, with no effective remedy to be expected. The patient feels that consulting a doctor could be useless. Both in acquired immunodeficiency syndrome (AIDS) [11] and polymyalgia rheumatica [12], a long delay between symptoms' onset and consulting a doctor has been demonstrated. This delay is significantly longer in women, in whom pain is more frequent. In addition, diagnoses made by non-specialists may be superficial or wrong. One of the goals of epidemiological studies is to collect information about risk factors and the underlying causes. Nonetheless, asking about possible causes could entail a bias in a cause–effect study. As a consequence, we feel that questions on physician-formulated diagnoses of specific diseases should not be included in health surveys. This view is reinforced by the fact that a questionnaire should be as short and simple as possible, with a careful choice of the questions. The focus should be on relevant issues, and answers that are easy to give and reliable.

Should intensity of pain be ascertained? Even doctors with little experience in evaluating pain know that its appreciation is very subjective and influenced by social, psychological and, possibly, genetic factors. As a result, pain intensity as such should not be included among the questions. A more objective way to bring pain intensity into the questionnaire is to assess a surrogate for it, that is, to ask for loss of function in daily activities or at work. The International Classification of Functioning, Disability and Health (ICF) developed by the WHO [13] may represent a useful guide to the activities that are relevant to the musculoskeletal system. In particular, chapter 4 on mobility includes paragraphs on: (1) changing and maintaining body position; (2) carrying, moving and handling objects; (3)

Table 1
Overview of several generic questionnaires used to investigate pain aspects, including number of Medline citations in the general literature and in articles dealing with musculoskeletal (MS) conditions, included dimensions, and characteristics of pain.

Questionnaire (reference)	Depression and somatic symptoms scale [43]	Illness attitude scale [44]	Health utilities index mark 3 [45]	EuroQoL-5D [46]	SF-36 [47]	Chronic pain grade questionnaire [48]	McGill pain questionnaire [14]	Brief pain inventory [49]
Number of questions	22	28	31	5	36	7	78	32
Type of answers	Semiquantitative (0–4)	Yes/No	Scale 1–6	Yes/no	Semiquantitative	Scale	Scale	Mixed
Number of Medline citations	240	911	191	2002	8995	115	50,269	855
Number of MS citations	21	54	26	211	1136	28	6118	101
Reference period	Last week	Actual	Usual	Today	Last 4 weeks	Last 6 months	Today	Last week
Number of dimensions	2	9	8	5	8	2	3	4
Dimensions	Depression and somatization	Hypochondria, experience of treatment, bodily symptoms	Vision, hearing, speech, cognition, dexterity	Self care, mobility, mood, usual activities, pain	Vitality, energy, fatigue, social functioning	Pain and disability	Pain	Demographics, pain and medications, work activities
Self care	No	No	No	Yes	Yes	No	No	No
Mobility	No	No	Yes	Yes	Yes	No	No	Yes
Anxiety/depression	Yes	Yes	Yes	Yes	Yes	No	No	No
Usual activities	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Pain intensity	Yes (4 levels)	No	Yes (6 levels)	Yes (3 levels)	Yes (6 levels)	Yes (10 levels)	Yes (6 levels)	Yes (10 levels)
Pain localization	Yes	No	No	No	No	No	Yes	Yes
Pain type	No	Yes (concerns)	No	No	No	No	Yes	Yes (15 categories)
Comorbidities	Yes (limited number)	No	No	No	No	No	No	No

Table 2

List of national health surveys performed in various parts of the World with coverage of pain items.

	Pain	
	General	Specific
Australia AL01 ^a	√	
Belgium BL01	√	√
Canada CA01	√	
Denmark DK01 ^a	√	
Finland FIN01		√
Germany DEU1 ^a	√	√
Ireland IRE01	√	
Japan JP01		√
Holland NL01		√
New Zealand NZ01 ^a	√	
Portugal PR01		√
Sweden SWE01		√
Switzerland SZ01		√
UK UK01 ^a	√	
UK UK03	√	
USA US01		√

^a SF-36 or SF-12.

walking and moving; and (4) moving around and using transportation. Chapters 5 (self care), 6 (domestic life) and 8 (major life areas, subsection work and employment) are also relevant for rheumatologists. Musculoskeletal problems often restrict self care, home care and work and leisure activities and cause loss of independence. The major reason is restricted mobility and dexterity. Both of these domains are not always included in HISs. Finally, another possibility to test pain intensity is to evaluate analgesic drug consumption during a given period of time.

Table 3

Characteristics of pain that can be investigated through questionnaires.

Anatomical localization
Number and combination of areas involved
Time period
Frequency
Duration
Time course (circadian, circaannual...)
Severity
Course
Age at onset
Self-reported underlying causes
Limitations in activities of daily living

Pain type can be described by using adjectives that try to define it. The adjectives reported in the McGill pain questionnaire [14] include the following: lickerish, quivering, pulsing, throbbing, beating, pounding, jumping, flashing, shooting, pricking, boring, drilling, stabbing, lancinating, sharp, cutting, lacerating, pinching, pressing, gnawing, cramping, crushing, tugging, pulling, wrenching, hot, boring, scalding, searing, tingling, itchy, smarting, stinging, dull, sore, hurting, aching, heavy, tender, taut, rasping, splitting, tiring, exhausting, sickening, suffocating, fearful, frightful, terrifying, punishing, gruelling, cruel, vicious, killing, wretched, blinding, annoying, troublesome, miserable, intense, unbearable, spreading, radiating, penetrating, piercing, tight, numb, drawing, squeezing, tearing, cool, cold, freezing, nagging, nauseating, agonising, dreadful and torturing. These descriptions are summarised in 20 categories (temporal, spatial, punctate pressure, incisive pressure, constrictive pressure, traction pressure, thermal, brightness, dullness, sensory miscellaneous, tension, autonomic, fear, punishment, affective and evaluative and their combinations) and a score is calculated for each category according to the number of positive responses. The results of this questionnaire can help to differentiate pain caused by different diseases or to compare health level in different populations of patients, as reported in a study of osteoarthritic pain in South versus North Italy [15]. This degree of specificity is obviously not requested in a questionnaire on musculoskeletal pain, but few definitions could be included to help define it.

Questions regarding the localisation of pain should be included to differentiate localised from widespread pain. This information may be obtained through multiple questions or, alternatively, by asking the patient to indicate the areas affected by pain on a mannequin. The latter method is more patientfriendly and is easily performed by most people. A comparison between written questions and the mannequin technique has been recently published [16]. The mannequin technique gave a slightly higher prevalence of positive indications than the written questions. Around three-quarters of those who reported pain on the written questionnaire also indicated pain on the mannequin at the same anatomical location. There were no differences in the percentage of agreement by sex, age group or level of education, suggesting that the two techniques are equivalent.

Duration of pain is critical to define chronicity. Usually, 3 months of unremitting pain are considered the cut off. Nonetheless, the date of onset of pain is difficult to remember and should not be asked directly. Another consideration is variations of pain with time. Pain can be present as a single episode, unremitting or intermittent. If this is the case, its frequency can be occasional or repeated. Pain can follow a specific daily pattern, with night pain being common in inflammatory conditions and fibromyalgia, and daylight pain in degenerative conditions. It can appear in the morning, some days of the week (e.g., weekend headache) [17] or some months of the year. Gout attacks, for instance, exhibit such seasonal pattern, being more frequent in the spring months [18].

Knowledge of presence, duration, type, localisation and time pattern of musculoskeletal pain gives a complete picture of the symptom. However, no study has addressed simultaneously these questions in rheumatic patients. Surrogate information can be retrieved from indicators measuring the effects of pain-associated musculoskeletal conditions (Table 4). Many of them are available from the health systems of most developed countries.

Summary of results of population studies on musculoskeletal pain

Musculoskeletal pain is common to most people at some time of their life. A summary of articles reporting musculoskeletal pain in different geographical areas is described in Table 5. The methods used to ascertain the prevalence of pain are extremely different. Only in few cases was CWP investigated. In the remaining studies, pain located in different areas of the body was studied. In addition, the denominator population at risk could differ as could age range considered and the interview methodology. In spite of the different techniques used in these epidemiological studies and the different social and cultural substrate of the studied populations, the prevalence of musculoskeletal pain showed values of approximately 30% (range 13.5–47%). In particular, CWP prevalence varied between 11.4% [19] and 24% [20]. In another study, only 15% of 20–72 year-olds reported no pain during the previous year, whereas 58% reported musculoskeletal pain during the previous week and 15% had musculoskeletal pain every day during the past year [21]. In Europe, nearly one-quarter of adults report having some form of “arthritis or rheumatism,” [22] but there is ample variation across different countries from

Table 4

Indicators that can be used to calculate the effects of pain-associated musculoskeletal conditions.

Available and comparable	Partly available
<ul style="list-style-type: none"> ■ Hospital beds (orthopaedics, rheumatology, rehabilitation) ■ Physicians employed (orthopaedics, rheumatology, physical medicine) ■ Nurses employed (nurses in rheumatology and orthopaedics, physiotherapists, ergotherapists) ■ Specialists in training ■ Technologies (MRI, CT, DXA) ■ Hospital in-patient discharges ■ Hospital day-care patients ■ Average length of hospital stay ■ Surgeries (hip and knee replacement, fragility fracture) ■ Sick leave ■ Disability pensions 	<ul style="list-style-type: none"> ■ Contacts with GPs ■ Contacts with medical specialists ■ Contacts with physiotherapists ■ Medicine use (pain killers, anti-inflammatory and antirheumatic agents), drugs for the treatment of osteoporosis, immunosuppressive agents ■ Waiting times for elective surgeries (arthroplasty hip and knee) ■ Work adaptation or change of work

16.6% in Sweden to 38.2% in Portugal. The incidence of chronic musculoskeletal pain has been calculated as 8.3% per year [23]. This value is extremely high but, fortunately, also the recovery rate was high with an average incidence of 5.4%.

CWP causes disability in a considerable number of individuals, but its magnitude remains to be identified. Disability is more severe in patients with CWP than in those with localised musculoskeletal conditions [24]. In most developed countries, musculoskeletal conditions cause more functional limitations in the adult population than do any other group of disorders. In the Ontario Health Survey [25], musculoskeletal conditions accounted for 40% of all chronic conditions, 54% of all long-term disability and 24% of all restricted-activity days. The prevalence was higher in women, and increased strongly with age. Musculoskeletal conditions are the main cause of disability in older age groups. In another Canadian study, the prevalence of disability due to arthritis/rheumatism was 2.7%, due to back disorders 1.6%, due to trauma 0.4%, due to bone disorders 0.1% and disability due to “other musculoskeletal conditions” was 0.5% [26]. In short-term sickness absence (less than 1–2 weeks),

Table 5

Prevalence of musculoskeletal pain derived from different studies performed throughout the World.

Authors	Country	Year	Prevalence, %	Details
Cunningham & Kelsey [32]	USA	1984	32.6	US Health and Nutrition Survey (HANES I)
Sternbach et al. [50]	USA	1986	45	Adults > 18 years
Magni et al. [51]	USA	1990	14.4	CWP, HANES I
Badley & Tennant [33]	West Yorkshire, UK	1992	24	>16 years, postal questionnaire
O'Reilly et al. [52]	Nottingham, UK	1998	28.7	Knee pain, age 40–79 years
Urwin et al. [39]	Manchester, UK	1998	37.2	>3 painful locations
Elliott et al. [23]	Grampian, UK	1999	31.8	Annual incidence 8.3%
Hagen et al. [53]	Oslo, Norway	2000	17	CWP, GP consultations
Cimmino et al. [30]	Chiavari, Italy	2001	27	
Bergman et al. [19]	Sweden	2001	11.4	CWP
Leveille et al. [20]	USA	2001	24	CWP
Català et al. [34]	Spain	2002	18.3	Telephone survey
Picavet et al. [54]	Netherlands	2003	44.4	Age > 25 years, localized pain
Al-Awadhi et al. [55]	Kuwait	2004	26.8	Localized pain
Salaffi et al. [31]	Marche, Italy	2005	26.7	
Suka & Yoshida [56]	Japan	2005	41.4	Localized pain
Friedrich et al. [57]	Austria	2006	36.4	Localized pain, last 3 weeks
Veerapen et al. [58]	Malaysia	2007	21.2	Localized pain
Pereira et al. [59]	Brazil	2009	30.4	Localized pain
Reyes-Llerena et al. [60]	Cuba	2009	43.9	Localized pain
Hensler et al. [61]	Germany	2009	18.4	General practice patients
Sjögren et al. [62]	Denmark	2009	13.5	Chronic pain in general
Smith et al. [63]	USA	2010	60.0	Last 2 years of life

musculoskeletal health problems are second only to respiratory disorders [27]. In long-term absence, which is more important than short-term absence for the individual in terms of disability, and for society in terms of costs, musculoskeletal conditions are the most common medical causes. Musculoskeletal injuries and disorders cause more than half of all sickness absence longer than 2 weeks in Norway [28] and Germany.

Musculoskeletal conditions are also common reasons for disability pensions. In Norway, among persons with disability pensions for musculoskeletal conditions in 1997, 44% were awarded for low back pain, 18% for muscle pain/fibromyalgia, 12% for osteoarthritis (OA) and 9% for rheumatoid arthritis (RA). The factors determining the progression from sick leave to disability pensions were also investigated [29]. The number of painful body sites was strongly associated with obtaining a disability pension during a 14-year follow-up study [30].

Risk factors for musculoskeletal pain

Several socio-demographic factors have been associated with CWP in the literature. Knowing these risk factors could be important to understand the mechanisms at play in the associated conditions and to improve chronic pain through preventive measures. Women in most studies complain more often of CWP than men, and this is directly related with age [31–35]. The prevalence of musculoskeletal pain increases up to nearly 65 years of age [19,36,37], an observation that has been explained mainly by cumulative effect, which becomes more prevalent with older age. A decline in pain complaint has been noted over 65 years, a fact that can be explained by the decline of the adverse physical and mental effects of the working place at the age of retirement. Another explanation for this phenomenon can be derived from the so-called 'healthy worker effect', that is, workers usually exhibit lower overall death rates than the general population due to the fact that severely ill and disabled persons are ordinarily excluded from employment [38]. Similarly, as elderly people with chronic diseases tend to die early, the survivors are a relatively healthy population with low prevalence of several diseases.

Low education, social isolation, low family income, depression, anxiety and sleep disorders, as well as performing manual work, being a recent immigrant, non-Caucasian and widowed, separated or divorced represent additional risk factors associated with musculoskeletal pain [19,33,39]. Andersson et al. [36] investigated the relationship between chronic pain and lifestyle factors in a prospective population study and showed that there is a correlation between widespread pain and smoking, sleep disturbance, anxiety and low physical activity. The presence of CWP predicts physical inactivity [40] and increasing physical activity during life has been associated with a decrease of pain in a number of musculoskeletal diseases. In particular, the grade in physical education during adolescence predicts the occurrence of soft-tissue pain in adulthood [41]. In addition, the excess mortality associated with CWP seems to be linked to low physical activity because adjustment for lifestyle factors eliminated the excess risk, which was mainly due to cardiovascular disease [42].

Conclusion

Chronic widespread pain (CWP) is a significant medical and socioeconomic problem in the society. It causes suffering, drug consumption and high frequency of sick leave and disability pensions. To better understand the role of individual risk factors, social and cultural influences and the effect on the health systems, international epidemiological comparative studies are needed. A major effort in the EU will be the development of common strategies to investigate musculoskeletal pain through HISs. To reach this goal, a careful selection of the questions to be considered is necessary. According to the experts' opinion, the interview should address (1) loss of daily life functions due to pain; (2) pain duration and patterns; (3) pain localisation; and (4) type of pain.

Existing information suggests that musculoskeletal pain affects between 13.5% and 47% of the general population, with CWP prevalence varying between 11.4% and 24%. The differences between different studies are high and are mainly due to methodological problems in ascertaining prevalence. As a consequence, standardisation of the investigation techniques is a main need in epidemiological studies.

Epidemiological studies have identified many individual, psychosocial and occupational risk factors for CWP and for its progression to disability. They include age, gender, smoking, low education, low physical activity, poor social interaction, low family income, depression, and anxiety, and sleep disorders, as well as performing manual work, being a recent immigrant, non-Caucasian and widowed, separated or divorced. It is not clear which is their prognostic factor when they are considered in combination, as is the rule in everyone's life. To improve epidemiological knowledge of CWP, research should focus on standardisation of the definition of CWP and of the prospective evaluation of individual and combined risk factors.

Practice points

- Many different studies have addressed the epidemiology of localised musculoskeletal pain but those on CWP are scanty.
- The prevalence of CWP of musculoskeletal origin is high in the community.
- Physical and psychosocial risk factors are at work in the development of CWP and in the determination of its outcome.

Research agenda

- Standardisation of the definition of CWP and of the methodology to be used in surveys is a relevant issue.
- Designing a musculoskeletal conditions-oriented pain questionnaire could improve the knowledge of CWP.
- Comparison of data on the frequency and impact of musculoskeletal conditions in different countries is needed.
- Prospective studies should evaluate individual and combined risk factors for CWP and its progression to disability.

References

- [1] Smith BH, Smith WAC, Chambers WA. Chronic pain-time for epidemiology. *Journal of the Royal Society of Medicine* 1996; 89:181–3.
- [2] Atzeni F, Cazzola M, Benucci M, Di Franco M, Salaffi F, Sarzi-Puttini P. Chronic widespread pain in the spectrum of rheumatological diseases. *Best Practice & Research Clinical Rheumatology* 2011;25:165–71.
- [3] Crombie IK, Croft P, Linton SJ, LeResche L, von Korff M, editors. *Epidemiology of pain*. 1st ed. Seattle: IASP Press; 1999.
- [4] Wolfe F, Smythe H, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al. The American College of Rheumatology 1990 criteria for the classification of fibromyalgia: report of the multicenter criteria committee. *Arthritis & Rheumatism* 1990;33:160–72.
- [5] Hunt IM, Silman AJ, Benjamin S, McBeth J, Macfarlane GJ. The prevalence and associated features of chronic widespread pain in the community using the “Manchester” definition of chronic widespread pain. *Rheumatology* 1999;38:275–9.
- [6] Cimmino MA, Hazes JM. Value of epidemiological research for clinical practice. *Best Practice & Research Clinical Rheumatology* 2002;16:vii–xii.
- [7] Natvig B, Picavet J. The epidemiology of soft tissue rheumatism. *Best Practice & Research Clinical Rheumatology* 2002;16: 777–93.
- [8] Cimmino MA, Parisi M, Moggiana G, Mela GS, Accardo S. Prevalence of rheumatoid arthritis in Italy: the Chiavari study. *Annals of the Rheumatic Diseases* 1998;57:315–8.
- [9] Cimmino MA, Zampogna A, Murrioni S, Baruffi S, Alessio G, Maio T, et al. Methodology of an epidemiologic prevalence study in rheumatology: the Chiavari study. *Reumatismo* 2002;54:40–7 [in Italian].
- [10] Kvien TK, Glennas A, Knudsdorff OG, Smedstad LM. The validity of self-reported diagnosis of rheumatoid arthritis: results from a population survey followed by clinical examination. *The Journal of Rheumatology* 1996;23:1866–71.
- [11] Stein MD, Crystal S, Cunningham WE, Ananthanarayanan A, Andersen RM, Turner BJ, et al. Delays in seeking HIV care due to competing caregiver responsibilities. *American Journal of Public Health* 2000;90:1138–40.
- [12] Cimmino MA, Parodi M, Caporali R, Montecucco C. Is the course of steroid-treated polymyalgia rheumatica more severe in women? *Annals of the New York Academy of Sciences* 2006;1069:315–21.

- [13] International classification of functioning, disability and health. Geneva: World Health Organization; 2001.
- [14] Melzack R. The McGill pain questionnaire: major properties and scoring methods. *Pain* 1975;1:277–99.
- [15] Cimmino MA, Salaffi F, Olivieri I, Trotta F, Frizziero L, Sarzi Puttini P, et al. Pain patterns in Italian patients with osteoarthritis: preliminary results of the M.I.D.A. study (Misurazione del Dolore nell' Artrosi). *Reumatismo* 2004;56:253–61 [in Italian].
- [16] van den Hoven LH, Gorter KJ, Picavet HS. Measuring musculoskeletal pain by questionnaires: the manikin versus written questions. *The European Journal of Pain* 2010;14:335–8.
- [17] Torelli P, Cologno D, Manzoni GC. Weekend headache: a retrospective study in migraine without aura and episodic tension-type headache. *Headache* 1999;39:11–20.
- [18] Gallerani M, Govoni M, Mucinelli M, Bigoni M, Trotta F, Manfredini R. Seasonal variation in the onset of acute microcrystalline arthritis. *Rheumatology (Oxford)* 1999;38:1003–6.
- [19] Bergman S, Herrström P, Högström K, Petersson IF, Svensson B, Jacobsson LT. Chronic musculoskeletal pain, prevalence rates, and sociodemographic associations in a Swedish population study. *The Journal of Rheumatology* 2001;28:1369–77.
- *[20] Leveille SG, Ling S, Hochberg MC, Resnick HE, Bandeen-Roche KJ, Won A, et al. Widespread musculoskeletal pain and the progression of disability in older disabled women. *Annals of Internal Medicine* 2001;135:1038–46.
- [21] Natvig B, Nessio Y I, Bruusgaard D, Rutle O. Musculoskeletal complaints in population. Occurrence and localization. *Tidsskrift for den Norske Lægeforening* 1994;114:323–7 [Norwegian].
- [22] European Opinion Research Group (EEIG). Eurobarometer 58.0. European union citizens and sources of information about health; 2003.
- *[23] Elliott AM, Smith BH, Hannaford PC, Smith WC, Chambers WA. The course of chronic pain in the community: results of a 4-year follow-up study. *Pain* 2002;99:299–307.
- [24] White KP, Harth M. The occurrence and impact of generalized pain. *Baillieres Best Practice & Research Clinical Rheumatology* 1999;13:379–89.
- [25] Badley EM, Wang PP. Arthritis and the aging population: projections of arthritis prevalence in Canada 1991 to 2031. *The Journal of Rheumatology* 1998;25:138–44.
- [26] Reynolds DL, Chambers LW, Badley EM, Bennett KJ, Goldsmith CH, Jamieson E, et al. Physical disability among Canadians reporting musculoskeletal diseases. *The Journal of Rheumatology* 1992;19:1020–30.
- [27] Stansfeld S, Feeney A, Head J, Canner R, North F, Marmot M. Sickness absence for psychiatric illness: the Whitehall II study. *Social Science & Medicine* 1995;40:189–97.
- [28] Brage S, Nygård JF, Tellnes G. The gender gap in musculoskeletal-related long-term sickness absence in Norway. *Scandinavian Journal of Social Medicine* 1998;26:34–43.
- *[29] Gjesdal S, Bratberg E, Maeland JG. Musculoskeletal impairments in the Norwegian working population: the prognostic role of diagnoses and socioeconomic status: a prospective study of sickness absence and transition to disability pension. *Spine* 2009;34:1519–25.
- *[30] Kamaleri Y, Natvig B, Ihlebaek CM, Bruusgaard D. Does the number of musculoskeletal pain sites predict work disability? A 14-year prospective study. *European Journal of Pain* 2009;13:426–30.
- [31] Cimmino MA, Parisi M, Moggiana GL, Maio T, Mela GS. Prevalence of self-reported peripheral joint pain and swelling in an Italian population: the Chiavari study. *Clinical and Experimental Rheumatology* 2001;19:35–40.
- *[32] Salaffi F, De Angelis R, Grassi WM. Arche Pain Prevalence Investigation Group (MAPPING) study. Prevalence of musculoskeletal conditions in an Italian population sample: results of a regional community-based study. I. The MAPPING study. *Clinical and Experimental Rheumatology* 2005;23:819–28.
- [33] Cunningham LS, Kelsey JL. Epidemiology of musculoskeletal impairments and associated disabilities. *American Journal of Public Health* 1984;74:574–9.
- [34] Badley EM, Tennant A. Changing profile of joint disorders with age: findings from a postal survey of the population of Calderdale, West Yorkshire, United Kingdom. *Annals of the Rheumatic Diseases* 1992;51:366–71.
- [35] Català E, Reig E, Artès M, Aliaga L, López JS, Segú JL. Prevalence of pain in the Spanish population: telephone survey in 5000 homes. *European Journal of Pain* 2002;6:133–40.
- [36] Andersson HI, Ejlertsson G, Leden I, Rosenberg C. Chronic pain in a geographically defined general population: studies of differences in age, gender, social class, and pain localization. *Clinical Journal of Pain* 1993;9:174–82.
- [37] Hagen KB, Kvien TK, Bjørndal A. Musculoskeletal pain and quality of life in patients with noninflammatory joint pain compared to rheumatoid arthritis: a population survey. *The Journal of Rheumatology* 1997;24:1703–9.
- [38] Li CY, Sung FC. A review of the healthy worker effect in occupational epidemiology. *Occupational Medicine (London)* 1999;49:225–9.
- *[39] Urwin M, Symmons D, Allison T, Brammah T, Busby H, Roxby M, et al. Estimating the burden of musculoskeletal disorders in the community: the comparative prevalence of symptoms at different anatomical sites, and the relation to social deprivation. *Annals of the Rheumatic Diseases* 1998;57:649–55.
- *[40] McBeth J, Nicholl BI, Cordingley L, Davies KA, Macfarlane GJ. Chronic widespread pain predicts physical inactivity: results from the prospective EPIFUND study. *European Journal of Pain* 2010;14:972–9.
- [41] Timka S, Petersson IF, Englund M. The grade in physical education in adolescence as predictor for musculoskeletal pain diagnoses three decades later. *Pain* 2010;150:414–9.
- *[42] Andersson HI. Increased mortality among individuals with chronic widespread pain relates to lifestyle factors: a prospective population-based study. *Disability and Rehabilitation* 2009;31:1980–7.
- [43] Hung CI, Weng LJ, Su YJ, Liu CY. Depression and somatic symptoms scale: a new scale with both depression and somatic symptoms emphasized. *Psychiatry and Clinical Neurosciences* 2006;60:700–8.
- [44] Kellner R. Abridged manual of illness attitude scale. Department of Psychiatry, School of Medicine, University of New Mexico; 1987.
- [45] Feeny D, Furlong W, Boyle M, Torrance GW. Multi-attribute health status classification systems: health utilities index. *Pharmacoeconomics* 1995;7:490–502.

- [46] The EuroQol Group. EuroQol – A new facility for the measurement of health related quality of life. *Health Policy* 1990;16: 199–208.
- [47] Brazier JE, Harper R, Jones NM, O’Cathain A, Thomas KJ, Usherwood T, et al. Validating the SF-36 health survey questionnaire: new outcome measure for primary care. *British Medical Journal* 1992;305:160–4.
- [48] Von Korff M, Ormel J, Keefe F, Dworkin S. Grading the severity of chronic pain. *Pain* 1992;50:133–49.
- [49] Cleeland CS, Ryan KM. Pain assessment: global use of the brief pain inventory. *The Annals, Academy of Medicine, Singapore* 1994;23:129–38.
- [50] Sternbach RA. Survey of pain in the United States: the Nuprin pain report. *The Clinical Journal of Pain* 1986;2:49–53.
- [51] Magni G, Caldieron C, Rigatti-Luchini S, Merskey H. Chronic musculoskeletal pain and depressive symptoms in the general population. An analysis of the 1st National Health and Nutrition Examination Survey data. *Pain* 1990;43:299–307.
- [52] O’Reilly SC, Muir KR, Doherty M. Knee pain and disability in the Nottingham community: association with poor health status and psychological distress. *British Journal of Rheumatology* 1998;37:870–3.
- [53] Hagen KB, Bjorndal A, Uhlig T, Kvien TK. A population study of factors associated with general practitioner consultation for non-inflammatory musculoskeletal pain. *Annals of the Rheumatic Diseases* 2000;59:788–93.
- *[54] Picavet HSJ, Schouten JSAG. Musculoskeletal pain in the Netherlands: prevalences, consequences and risk groups: the DMC3-study. *Pain* 2003;102:167–78.
- [55] Al-Awadhi AM, Olusi SO, Moussa M, Shehab D, Al-Zaid N, Al-Herz A, et al. Musculoskeletal pain, disability and health-seeking behavior in adult Kuwaitis using a validated Arabic version of the WHO-ILAR COPCORD core questionnaire. *Clinical and Experimental Rheumatology* 2004;22:177–83.
- [56] Suka M, Yoshida K. Musculoskeletal pain in Japan: prevalence and interference with daily activities. *Modern Rheumatology* 2005;15:41–7.
- [57] Friedrich M, Rustler T, Hahne J. Prevalence of self-reported musculoskeletal pain in the Austrian population. *Wiener Klinische Wochenschrift* 2006;118:82–9 [in German].
- [58] Veerapen K, Wigley RD, Valkenburg H. Musculoskeletal pain in Malaysia: a Copcord survey. *The Journal of Rheumatology* 2007;34:207–13.
- [59] Pereira AM, Valim V, Zandonade E, Ciconelli RM. Prevalence of musculoskeletal manifestations in the adult Brazilian population: a study using the copcord questionnaires. *Clinical and Experimental Rheumatology* 2009;27:42–6.
- [60] Reyes-Llerena GA, Guibert-Toledano M, Penedo-Coello A, Pérez-Rodríguez A, Baez-Dueñas RM, Charnicharo-Vidal R, et al. Community-based study to estimate the prevalence and burden of illness of rheumatic diseases in Cuba: a COPCORD study. *Journal of Clinical Rheumatology* 2009;15:51–5.
- [61] Hensler S, Heinemann D, Becker MT, Ackermann H, Wiesemann A, Abholz HH, et al. Chronic pain in German general practice. *Pain Medicine* 2009;10:1408–15.
- [62] Sjøgren P, Ekholm O, Peuckmann V, Grønbaek M. Epidemiology of chronic pain in Denmark: an update. *European Journal of Pain* 2009;13:287–92.
- *[63] Smith AK, Cenger IS, Knight SJ, Puntillo KA, Widera E, Williams BA, et al. The epidemiology of pain during the last 2 years of life. *Annals of Internal Medicine* 2010;153:563–9.