

Work-related disease in general practice: a systematic review

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Objectives. The objective was to answer the following questions: What is the prevalence of potentially work-related diseases in the general practice population? What is the incidence of consulting a GP for a potentially work-related disease? What is the relationship between diseases seen in general practice and work ability?

Methods. Cochrane standards and QUOROM principals were used. For this systematic review the available literature was identified in a computerized search of the bibliographical databases Medline, Embase and Osh-rom. A total of 22 publications (24 studies) met the inclusion criteria.

Results. In the general practice population high prevalence rates of potentially work-related diseases were found for low back pain, neck pain and shoulder pain. Incidence rates of consulting a GP for a potentially work-related disease were high also. Musculoskeletal disorders were the main reasons for work-related consultations in general practice. Work-related diseases can affect work ability.

Conclusions. Work-related diseases are common, given the high incidence and prevalence of potentially work-related diseases found in the general practice population and seen by the GP. This review underlines the important role of GPs in identifying and managing work-related diseases. GPs should consider the work factor and pay special attention to the effects of work on health, because patients often link their work with their illness.

Keywords. General practice, incidence, prevalence, work ability, work-related diseases.

Introduction

Work-related diseases are defined as multi-factorial diseases among a working population, which are partly caused by work, and/or aggravated, accelerated or exacerbated by occupational exposures, and/or the cause of impaired work capacity. This definition is partly based on a WHO definition.¹ GPs have an important role in identifying and managing work-related diseases. Frequently, GPs do not recognize the work-relatedness of diseases,^{2,3} which may lead to more serious health problems or unnecessary (long) absenteeism from work.

This not only affects the health of the patient, but also brings higher costs for companies as well as society.⁴⁻⁶ Conversely, if GPs were more able to recognize the work-relatedness of a disease, there is a potential for more adequate prevention and less absenteeism from work.⁷ The issue of work-related stress in general practice was studied by Russell and Roach.⁸ They found that GPs with training or experience in occupational health were less likely to advise the patient to stay away from work.⁸ Although it is obvious that in many health care systems the GP is the first health care professional who is consulted by workers for work-related diseases, the role of GPs in relation to work-related diseases has not yet been explored systematically in the literature.^{9,10} Only a few estimates have been made of the prevalence and incidence of work-related diseases encountered in primary care settings.¹¹ A more accurate estimate of such prevalence and incidence rates could increase the awareness of GPs with regard to this issue. This is important, because it would support the GP in his registration of the work-relatedness of diseases. This review aims at describing: the prevalence of potentially work-related diseases in a general practice

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population; the incidence of consulting a GP for a potentially work-related disease; and the relationship between diseases seen in general practice and work ability.

Methods

Search

The available literature was identified by means of a computerized search of the bibliographical databases Medline (1966–June 2003), Embase (1988–April 2002) and Osh-rom (1990–April 2002). The following combinations of keywords were used: (family practice OR family physician OR general practitioner OR family practitioner OR GP OR family doctor OR family physician OR primary health care OR primary care) AND (occupation OR work-related OR worker OR industrial OR work OR labour OR labor). An additional reference search for potentially eligible publications was conducted in the personal archives of the authors.

Selection

A crude selection was made by the first author, based on information obtained from the title and abstract of the publications resulting from the initial search strategy. The final selection was performed by the first and second author (HW and AvdB), based on the full text of the publications resulting from the crude selection. Both selections were based on the following inclusion criteria: i) the study should concern patients of a working age in a general practice population or should concern working patients seen in general practice; ii) the disease should be work-related (see definition in introduction); iii) the publication should be a full report written in English or a Germanic language.

The publications resulting from the final selection were screened on three topics. These three topics were: i) the prevalence of potentially work-related diseases in a general practice population; ii) the incidence of consulting a general practitioner for a potentially work-related disease, and iii) the relationship between diseases seen in general practice and work ability.

Quality assessment

The quality of the publications was assessed by two reviewers (HW and AvdB) on the basis of the following four quality criteria:

- The study population; is it a general practice population with participants of a working age (–), or are all participants in the study workers (+)?
- Type of study; is the study cross-sectional (–), a retrospective cohort (–), or a prospective cohort (+)?
- Outcome assessment; is the health outcome based on self-report (–), or is it based on method of

assessment such as anamnesis or physical examination (+)? Is the assessment of the consultation based on self-report (–), or is it based on registration or a medical record (+)?

Outcome definitions; is the prevalence or incidence rate calculated by authors of the original paper and/or can it be calculated from the available data by the authors of the present study (+)?

If three or four of these quality criteria categories scored a plus, the study was considered to be of high quality. In all other cases a study was considered to be of low quality for the purpose of this review. Given the fact that only descriptive studies were included, this limited set of criteria was formulated, keeping the Cochrane standards¹² and QUOROM¹³ principals in mind. For this review a structured format and a systematic search strategy was used according to Cochrane standards. The method section allows the reader to assess whether the review was done in such a way as to justify its conclusions. The quality of the studies was considered. A meta-analysis was not possible due to insufficient quality and number of studies. This review aimed to be relatively easy to understand for GPs and is updateable.

Results

Selection

As can be seen from Figure 1, the initial search resulted in 2701 titles and abstracts. The crude selection reduced this number to 80 publications, mostly in English. The first and second authors read the full text of these publications. The final selection resulted in a total of 21 eligible publications. On the basis of an additional reference search, one more publication¹⁴ was added. There were five studies^{15–19} on the prevalence of potentially work-related diseases in the general practice population, thirteen studies^{14,19–30} on the prevalence and/or incidence of consulting a GP for a potentially work-related disease, and five studies^{6,28,30–32} on the relationship between diseases seen in general practice and work ability. Finally, two studies were found on the perspective of patients with regard to the work-relatedness of their disease.^{3,5} These two studies are mentioned in the discussion. Three publications referred to two topics^{19,28,30} and two of these consisted of different sub-studies.^{28,30} These sub-studies were scored separately in the quality assessment. Two publications were based on the same dataset.^{27,29} These were considered as one study in the results and table.

Quality assessment

The scoring by the two reviewers (HW and AvdB) of the 24 studies (22 publications) on four quality criteria led to an overall initial agreement of 82% (79/96), with a kappa for agreement of 0.65. This indicates good agreement.³³

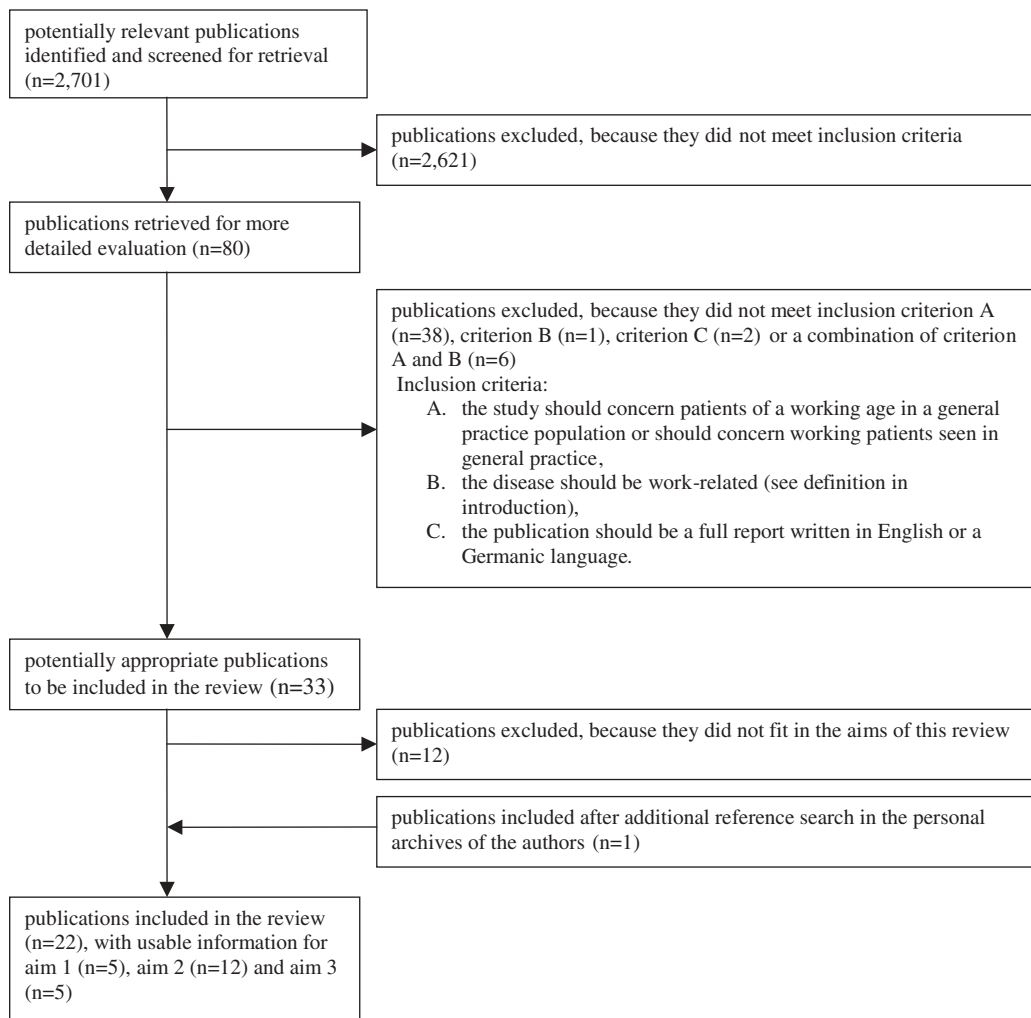


FIGURE 1 Flow diagram of publications included in the review according to QUORUM principles of publication selection

The two reviewers subsequently reached consensus on all 17 initial disagreements. Table 1 shows the ratings of the 24 studies in order of their quality score. Eight of these studies^{14,21,24,25,27-30} had three or four positive scores on the quality criteria, and were therefore considered to be of high quality. Consequently, 16 of the 24 studies^{3,5,6,15-20,22,23,26,28,30-32} were considered to be of low quality for the purpose of this review.

Prevalence of potentially work-related diseases in the general practice population

As can be seen from Table 2, prevalence data were assessed in a primary care population for a variety of specific potentially work-related diseases.

In a study carried out by de Bono and Hudsmith, a lifetime prevalence of 5.7% for (potentially) work-related asthma was reported in a general practice population. In this population the lifetime prevalence of occupational asthma was found to be 0.12%.¹⁵ Other studies investigated the prevalence of neck and

shoulder pain. In a general practice population, two studies carried out by Palmer *et al.* reported on the one-week prevalence of neck pain: 18.5%¹⁷ and 19.6%.¹⁶ In one of these studies, the one-year prevalence of neck pain was found to be 33.7%,¹⁷ and in the other the one-week prevalence of shoulder pain was found to be 21.3%.¹⁶ Pope *et al.* observed a one-month prevalence of shoulder pain of 18.0%.¹⁸ Palmer *et al.* also investigated at the one-week prevalence of elbow pain (10.5%) and the one-week prevalence of hand/wrist pain (16.1%).¹⁶ The reported musculoskeletal diseases had an effect on the work capacity. The one-year prevalence of neck pain interfering with normal activities was 11%¹⁷ and the one-year prevalence of neck pain, shoulder pain, elbow pain and hand/wrist pain preventing activity was 8.3%, 9.0%, 4.1% and 7.8%,¹⁶ respectively. In a study carried out by Walsh *et al.* the one-year prevalence of low back pain was found to be 36.1% and the lifetime prevalence of low back pain was found to be 58.3%.¹⁹

TABLE 1 *The ratings of the 24 studies in order of their quality score*

Study (first author)	1) population	2) study design	3) outcome definition (diagnosis)	4) outcome definition (incidence/prevalence)	5) high (+) or low (-) quality study
Copeman ²⁰	-	+	+	-	-
de Bono ¹⁵	-	-	+	+	-
Fleming ²¹	+	+	+	+	+
Frymoyer ²²	-	-	+	+	-
Haastrup ²³	-	+	+	-	-
Harber ⁵	+	-	-	-	-
Kellerman ²⁴	-	+	+	+	+
Kibsgard ²⁵	-	+	+	+	+
Lanier ³¹	+	+	-	-	-
Lessenger ²⁶	-	-	+	-	-
Macfarlane ²⁷	+	+	+	+	+
Miedema ²⁸	-	+	+	+	+
Miedema ²⁸	-	-	-	+	-
Palmer ¹⁶	+	-	-	+	-
Palmer ¹⁷	+	-	-	+	-
Papageorgiou ²⁹	+	+	+	+	+
Pedersen ³⁰	-	+	+	+	+
Pedersen ³⁰	-	+	+	-	-
Pope ¹⁸	+	-	-	+	-
Reiso ⁶	+	-	+	-	-
Stein ³	+	-	-	+	-
Taylor ³²	-	-	+	-	-
Van der Velden ¹⁴	+	+	+	+	+
Walsh ¹⁹	-	-	-	+	-

In the first column the first author of the rated publications on work-related diseases in general practice, followed by four columns representing the rates according to four quality criteria. The last column presents the total result of the ratings on the four quality criteria. Abbreviations: + = yes; - = no.

TABLE 2 *Details regarding the publications on the prevalence of potentially work-related diseases in the general practice population and a summary of the results*

Reference/country	Study population/ n/GPs or FPs	Type of study	Prevalence and/or incidence of potentially work-related diseases in the general practice population
1. de Bono ¹⁵ UK	A general practice population n = 6077 GPs = 4	Cross-sectional survey	Lifetime prevalence of all asthma = 5.7% Lifetime prevalence of occupational asthma = 0.12%
2. Palmer ¹⁶ UK	A general practice population n = 12 907 GPs = 34	Cross-sectional survey	One-week prevalence of neck pain = 19.6% One-year prevalence of neck pain = 33.7% One-year prevalence of neck pain interfering with normal activities = 11.0%
3. Palmer ¹⁷ UK	A general practice population with manual occupation n = 1856 GPs = 34	Cross-sectional survey	One-week prevalence of neck pain = 18.5% One-week prevalence of shoulder pain = 21.3% One-week prevalence of elbow pain = 10.5% One-week prevalence of hand/wrist pain = 16.1% One-year prevalence of neck pain preventing activity = 8.3% One-year prevalence of shoulder pain preventing activity = 9.0% One-year prevalence of elbow pain preventing activity = 4.1% One-year prevalence of hand/wrist pain preventing activity = 7.8%
4. Pope ¹⁸ UK	Workers randomly selected from a general practice n = 217 FP = 1	Cross-sectional survey	One-month prevalence of shoulder pain = 18.0%
5. Walsh ¹⁹ UK	A general practice population 20–59 years n = 2667 GPs = 136	Cross-sectional survey	Lifetime prevalence of low back pain = 58.3% One-year prevalence of low back pain = 36.1%

An interesting phenomenon was observed in studies in which the patient's perspective with regard to the work-relatedness of his/her disease was investigated. Harber *et al.* found that 39% of 108 patients, who were questioned in their GPs' waiting room, thought that their illness was possibly caused by work, and two thirds also said also that they thought that their illness was possibly worsened by their work.⁵ Stein and Franks used a questionnaire among 362 pre-scheduled working patients at the time of their visit. They found that 38% of these patients reported current work-related health problems.³

Prevalence or incidence of consulting a GP for a potentially work-related disease

In this paragraph the prevalence or incidence rates of consulting a GP were assessed for several potentially work-related diseases (Table 3). What does this mean for the individual GP? A one-year incidence of 5% for consulting for low back pain in a practice of 2500 patients means that the GP should see 3 patients a week on average with a new episode of low back pain. Fleming and Charlton found that the one-year prevalence of consulting a GP for asthma was 4.3% for working persons between 35 and 64 years of age, and 4.6% for those between 16 and 34 years.²¹ In this study the one-year prevalence of consulting a GP for chronic obstructive pulmonary disease ranged from 5.0% to 7.7%, and for acute respiratory infections it ranged from 18.8% to 20.5%. For ischaemic heart disease a large difference between age-groups was found. In the age-group 16–34 years the one-year prevalence was 0.08% and in the age-group of 35–64 years it was 8%.²¹ These differences were statistically significant ($P < 0.05$). Finally, the one-year prevalence of consulting a GP for all circulatory disorders also showed a great difference between the two age-groups: 2.2% for 16–34 years and 23.2% for 35–64 years.²¹ Kibsgard *et al.* reported a one-year incidence of 15.9% for consulting a GP for work-related diseases.²⁵ Van der Velden *et al.* found a three-month incidence of 12.4% for consulting a GP for potentially work-related diseases.¹⁴ Four publications had comparable findings with regard to the incidence of consulting a GP for low back pain. However, the one-year incidence in the resulting three studies was 3.8%,³⁰ 4.5%,^{27,29} and 7.0%,²⁸ respectively. Furthermore, in a study carried out by Frymoyer *et al.*, a four-year prevalence of 10.2% was found for consulting a GP for an episode of work-related low-back pain.²² Walsh *et al.* found a one-year prevalence of 14.6% for consulting a GP for low back pain.¹⁹ Four studies gave information on the incidence of consulting a GP for a work-related injury. The 56-month incidence of consulting a GP for a work-related injury was found by Kellerman to be 5.5%.²⁴ Lessenger and Giebel reported that during a period of 54 months, 2846 industrial illnesses and injuries were seen in one general practice.²⁶ However,

these consultations were highly skewed (range 1–66). Copeman *et al.* observed that during a period of six months 6.0% of all patients consulting a GP were identified as having a work-related injury.²⁰ Haastrup reported that 1.1% of all consultations during the day concerned occupational accidents, and 0.7% dealt with occupationally-conditioned complaints.²³

The relationship between diseases seen in general practice and work ability

In the previous paragraphs relatively high incidence and prevalence rates for several work-related diseases in general practice were found. Work-related diseases are a substantial part of the diseases presented in general practice. Accordingly, GPs should be aware of this issue, because in many patients work can effect the disease and, vice versa, diseases can influence work ability. Only a few studies were found that reported on the influence of work-related diseases on work ability in general practice. All these studies used different methods and studied this issue from different perspectives (Table 4). Only one study investigated the prevalence of chronic disabilities affecting work capacity, and found an overall rate of disability affecting work capacity of 12.3%.³² Another way to assess the relationship between work and disease is to register the number of days of absenteeism from work due to health complaints. In a survey carried out by Reiso *et al.*, GPs assessed the main reason for absenteeism from work due to health complaints.⁶ Musculoskeletal disorders (30%) and respiratory disorders (29%) were found to be the main reasons, followed by psychological disorders (13%).⁶ In Perderson's cohort study the GP assessed that 64% of patients with low back pain were still fit for work.³⁰ In this study, in 28% of all patients with low back pain the onset was related to work, and 37% had a previously been absent from work because of low back pain.³⁰ In another cohort study, Lanier and Stockton found that 74% of general practice patients with acute low back pain were absent for four days or less from work, while 26% were absent for more than four days.³¹ Miedema *et al.* studied the risk of low back pain becoming chronic in general practice patients. They found that 28% of patients with low back pain had a chronic back disorder seven years later, and 38% of these patients had stopped working.²⁸

Discussion

Statement of principal findings

Work is an important factor in a patient's life, and can potentially have a great influence on the patient's health and well-being. Vice versa, diseases can influence work ability. At the start of this review it was expected to find a broad range of scientific evidence on this subject. However, only a limited amount of research focussed

TABLE 3 Details regarding the publications on the incidence and prevalence of consulting a GP for a potentially work-related disease and a summary of the results

Reference/country	Study population/n/GPs or FPs	Type of study	GP consultation		
1. Fleming ²¹ UK	Employed persons in a general practice population <i>n</i> = 93 692 GPs = 64	Cohort study (prospective)	one-year prevalence of consulting for: Asthma COPD ARI IHD ACD	16–34 years	35–64 years
				4.6%	4.3%
				5.0%	7.7%
				20.5%	18.8%
				0.08%	8%
				2.2%	23.2%
2. Frymoyer ²² USA	A general practice population <i>n</i> = 3920 FP = 1	Cohort study (retrospective)	4-year prevalence of consulting for an episode of low back pain = 10.2%		
3. Kibsgard ²⁵ Denmark	A general practice population <i>n</i> = 3017 GPs = 114	Cohort study (prospective)	One-year incidence of consulting for work-related diseases = 15.9%		
4. Macfarlane ²⁷ and Papageorgiou ²⁹ UK	Individuals in employment and free of low back pain <i>n</i> = 1412 FPs = 2	Cohort study (prospective)	One-year incidence of consulting for low back pain = 4.5%		
5. Miedema ²⁸ The Netherlands	A general practice population <i>n</i> = 97 587 GPs = 44	Cohort study (prospective)	One-year incidence of consulting for new (38%) or recurring (62%) back problems = 7%		
6. Pedersen ³⁰ Denmark	A general practice population <i>n</i> = 78 GP = 1	Cohort study (prospective)	One-year incidence of consulting for low back pain = 3.8%		
7. Van der Velden ¹⁴ The Netherlands	Employed persons in a general practice population <i>n</i> = 335 000 FPs = 103 (GPs = 161)	Cohort study (prospective)	3-month incidence of consulting for potentially work-related diseases = 12.4%		
8. Walsh ¹⁹ UK	A general practice population 20–59 years <i>n</i> = 2667 GPs = 136	Cross-sectional survey	one-year prevalence of consulting for low back pain = 14.6%		
9. Copeman ²⁰ Australia	Patients in a primary health centre <i>n</i> = 4170 GPs = 5	Cohort study (prospective)	In a 6-month period, 6.0% of consulting patients were identified as having a work-related injury		
10. Haastrup ²³ Denmark	Patients in general practice <i>n</i> = ? GP = 33	Cohort study (prospective)	1.1% of all consultations during the day concerned occupational accidents and 0.7% dealt with occupationally-conditioned complaints		
11. Kellerman ²⁴ USA	Persons seen in a rural family practice <i>n</i> = 2500 GPs = 1	Cohort study (prospective)	56-month incidence of consulting for work-related injury = 5.5%		
12. Lessenger ²⁶ UK	Patients in a general practice <i>n</i> = 2430 FP = 1	Cross-sectional survey	2846 industrial illnesses and injuries in 54 months (mean 2.99 consultation per injury; mode = 1.0; median = 4.0; range 1–66)		

COPD = chronic obstructive pulmonary disease; ARI = acute respiratory infections; IHD = ischaemic heart disease; ACD = all circulatory disorders.

on work-related diseases or the work-relatedness of diseases in general practice was found. Moreover, two thirds of the few available studies on this topic were of low quality for the purpose of the present review.

The included studies reported relatively high prevalence rates for some work-related diseases in general practice. Harber *et al.* as well as Stein and Franks found that more than one third of patients consulting a

TABLE 4 Details of publications on diseases in general practice potentially influencing work ability and a summary of the results

Reference/country	Study population/n/GPs or FPs	Type of study	Work-related health complaints
1. Lanier ³¹ USA	Patients consulting GP for acute low back pain <i>n</i> = 104 FPs = 7	Cohort study (prospective)	74% ≤4 days absent from work 26% >4 days absent from work
2. Miedema ²⁸ The Netherlands	Patients with an episode of back pain <i>n</i> = 444 GPs ≤ 44	Cohort study (partly retrospective and partly prospective)	After 7 years, 28% of the patients with back symptoms developed a chronic back disorder, and 38% of these stopped working
3. Pedersen ³⁰ Denmark	A general practice population <i>n</i> = 78 GP = 1	cohort study (prospective)	64% fit for work 37% had a previous absence from work due to low back pain 28% onset related to work 32% had hard work
4. Reiso ⁶ Norway	Patients certified sick <8 days <i>n</i> = 408 GPs = 49	cross-sectional survey	Work ability, assessed by GPs, was reduced in: 30% of the cases by musculoskeletal disorders 29% of the cases by respiratory disorders 13% of the cases by psychological disorders 28% by other disorders or injuries
5. Taylor ³² UK	Patients seen in general practice (16–64 years) <i>n</i> = 3299 FP = 1	cross-sectional survey	Disability affecting work capacity = 12.3%

general practice thought that their illness was possibly caused by work or had self-reported work-related health problems.^{3,5} With regard to the incidence of consulting a GP for a potentially work-related disease, the one-year incidence of consultations for low back pain was the only topic reported in several comparable studies. The one-year incidence of consulting a GP for low back pain varied in three studies between 3.8% and 7.0%.

Strengths and weaknesses of this review

This is, to our knowledge, the first systematic review of studies on work-related diseases in general practice. The search strategy was systematic, according to Cochrane standards and sensitive, with a broad scope of keywords, so there was only a small chance that publications were missed in the databases that were searched. However, because the search was limited to English and Germanic languages and studies published in the journals of the selected databases, it can not be ruled out that relevant publications in other languages were missed, as well as unpublished reports or manuscripts published in journals not included in these databases. Another limitation of this review concerns in the small number of studies in the final selection. The total number of good quality studies (*n* = 8) on this topic was also low, given the number of studies included (*n* = 24).

Despite the perception of patients, the GP often fails to identify or register work-related exposures. This was demonstrated in the study carried out by Stein and Franks, who found that 60 patients had reported hazardous exposures at work, but that this was only recorded in the medical charts of five patients.³ De Bono

and Hudsmith reported similar findings.¹⁵ In their study, a third of the patients diagnosed with asthma had an occupation that could be the cause of or contribute to their asthma. Only in 18% (9/50) of the cases was there any record of a reference to occupational asthma.¹⁵

The selected studies showed differences in study design and definitions, and a broad spectrum of outcome measures. Due to their heterogeneity and low methodological quality, the studies could not be compared. Furthermore, international differences in the social system and the economic situation, as well as differences in the legal system, regulations and policies regarding work and health, affect the management of work-related diseases in general practice. As a result there are international differences in the role of the GP in the health system. These differences will influence the study results, and hamper comparison of the results of studies from different countries. However, regardless of how the tasks are divided in the different systems and settings, patients with work-related diseases will frequently consult their GP.

Implications for future research and clinical practice

One important recommendation for future research on work and health can be deduced from the results of the current review. Work-related diseases are common in general practice, but this topic has not received adequate attention. Therefore, further research is needed on the subject of work-related diseases in general practice. This review underlines the important role of GPs in identifying and managing work-related diseases. GPs should consider the work factor and pay special

attention to the effects of work, because patients often link their work with their illness. Training of GPs in occupational medicine and proper communication with their patients on this topic can improve managing work-related health problems in primary health care.

Declaration

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