

Workers with a chronic disease and work disability

Problems and solutions

Chronic diseases within the German labour force

The concept chronic disease has various meanings. The term used to be reserved for serious and irreversible diseases. Nowadays it includes most long-lasting diseases, such as those lasting for more than 3 months. Cancer, which if curable necessitates a lengthy recovery period, is classified among the chronic diseases as well. Recently usage of the term has been further extended to risk factors for chronic diseases like high blood pressure or obesity. The fluidity of the concept is illustrated by the reflections of Waddell et al. [1]. They distinguish *common health problems* such as mild or moderate musculoskeletal, mental health and cardiorespiratory conditions from *severe medical conditions*, such as neurological disease or blindness. In their opinion, it is the second group that is serious and in need of specialised rehabilitation. Although the characterisation of Waddell et al. is disputable since, for example, many conditions start as diseases without serious limitations, but end with severe disabilities, it throws light on of the lack of consensus on the definition of chronic disease. In this article we use a broad definition as applied in the GEDA ("Gesundheit in Deutschland Aktuell", Current Health in Germany) study. In this health interview survey, health conditions or risk factors such as hypertension and obesity are included as well as diseases that may manifest themselves in mild or

more serious forms such as back pain, depression or asthma (see □ Tab. 1).

Departing from this broad definition, chronic diseases are widespread within the adult populations of industrialised countries and Germany is no exception to this rule¹. This chronic morbidity is strongly related to age. While approximately half of the population aged 30–49 has one or more chronic diseases, this figure rises to 74% and 79% respectively for men and women aged 50–64. More than half of the persons in this age group even have two or more chronic conditions. Although most disease categories have a low prevalence, generally less than 10%, also in the higher age groups, this does not hold for cardiometabolic conditions and musculoskeletal diseases. Cardiometabolic risk factors or conditions (hypertension, obesity, hypercholesterolemia, diabetes) are found in more than 30% of men aged 30–49 years and about a quarter of women aged 30–49 years. For 50- to 64-year-old men and women almost 60% have a cardiometabolic condition. Musculoskeletal diseases are found in 20% of 30- to 49-year-old men and about a quarter of 30- to 49-year-old women. More than a third of 50- to 64-year-old men have a musculoskeletal disease and for the women in this age group this figure is almost

50% [2]. With the current aging of the labour force, this means that the number of unhealthy workers is increasing.

The combined 2009 and 2010 GEDA studies provide insight into the prevalence of 20 common chronic health conditions for working and non-working individuals, organised into eight disease categories. The studies are telephone surveys conducted from July 2008 to July 2010 among adults 18 years of age and older, living in private households with landline telephones. The list of health conditions was presented to the respondents and they were asked whether a physician had ever told them that they had the disease and whether it had been present within the past 12 months. The response rate, meaning the proportion of identified respondents willing to participate in the survey (Cooperation Rate at respondent level) was 51.2% in 2009 and 55.8% in 2010. All analyses were weighted to the general German population aged 18–65 years, stratified by age groups, gender, region of residence and educational level [3]. The studies demonstrate that 49% of the male and 53% of the female workers report having one or more chronic diseases. For non-working individuals the prevalence figures are even higher. Highly prevalent among the workers are the above mentioned cardiometabolic conditions and musculoskeletal diseases. We see that the prevalence figures differ between male and female workers. Female workers experience more often muscu-

¹ Nowadays, chronic medical conditions are frequently presented under the umbrella term *noncommunicable diseases*, for instance by the WHO, the UN, and the EU.

Tab. 1 Prevalence of diseases/conditions for men and women aged 18–65 years by employment status (n=35,573)^a

	Men		Women	
	Not employed	Part-time or full-time employed ^b	Not employed	Part-time or full-time employed ^b
	%	%	%	%
Specific disease categories (health conditions) ^c				
Cardiometabolic conditions (hypertension, hypercholesterolemia, diabetes, obesity (BMI ≥30))	42.3	34.0	38.5	29.1
Cardiovascular disease (ever) ^d (myocardial infarction, angina pectoris or any other coronary heart disease, chronic heart failure, stroke)	14.1	4.7	5.8	3.0
Lower respiratory disease (asthma, chronic bronchitis)	8.9	4.6	9.9	7.2
Liver/renal diseases (chronic liver disease, chronic renal disease)	3.8	1.4	2.8	1.3
Musculoskeletal disease (osteoarthritis, rheumatoid arthritis, osteoporosis, chronic back pain)	30.8	19.5	35.6	27.8
Cancer (ever) ^d (lifetime medical history of any type of cancer)	5.5	2.4	6.6	4.8
Depression	10.4	3.7	11.2	7.4
Severe sensory limitations (severe hearing or visual impairment)	5.2	2.7	4.8	2.8
Number of diseases and conditions				
No diseases	40.1	51.0	39.7	46.9
One disease	19.7	24.6	22.4	26.7
Two or more diseases	40.2	24.5	37.8	26.5

^aData: GEDA (Gesundheit in Deutschland Aktuell) 2009 and 2010 combined, age 18–65 years ^bPart-time or full-time employed: currently in paid work, disregarding the number of hours

^cSubjects included in single disease categories may have another disease as well (comorbidity) ^dFor these disease categories lifetime prevalence estimates are presented instead of annual prevalence estimates.

loskeletal diseases, depression, lower respiratory disease and cancer than men, whereas male workers are more often troubled by cardiometabolic conditions and cardiovascular diseases than women (**Tab. 1**).²

The employment figures for 10-year age groups for various disease categories are presented in **Tab. 2**. It can be seen that age influences employment independent of disease: the employment rate for healthy 55- to 64-year-olds drops substantially compared to that of healthy younger individuals. Women consequently have lower employment rates than men. In addition to this, we find that, depending on disease category, employment rates may be substantially lower for chronically ill than for healthy individuals. We also observe that having one chronic disease is hardly problematic, whereas with two or more diseases the labour participation

rate drops considerably. The lowest employment figures are found for liver and renal diseases and for depression. The relatively high employment rates for women with cancer are remarkable as are the low figures for severe sensory limitations. For cardiometabolic conditions and musculoskeletal diseases, the employment figures are relatively high. However, as these are the disease groups with a high prevalence, they weigh heavily on the national employment rate. On the other hand, comorbidity with cardiovascular and musculoskeletal diseases presumably causes an overestimation of the impact of an unfavourable cardiometabolic condition as a separate category. Although we have to be careful with low numbers for less prevalent diseases, especially in the lower age groups, we observe that the influence of disease on employment is already clearly visible in the 35–44 age group and is substantially present in the 54–65 age group (**Tab. 2**).

Asked whether their medical condition was seen as a cause for unemployment, a large minority of those with recent unemployment experiences states that this is the case. Especially liver and renal diseases

pose a risk of job loss according to the respondents (**Tab. 3**). Of course, these data may be biased due to the effect that people ascribe meanings to a situation afterwards.

In conclusion, chronic diseases are highly prevalent in the population (18–65 years of age), and their prevalence is strongly correlated with employment rates, particularly in the case of comorbidity. Especially in the older age-groups do we see that employment rates are substantially lower, partly as a result of ongoing health selection. The lower opportunities for elder workers on the labour market and decreasing motivation to continue working may play a role as well. We have to bear in mind that within disease categories, various health conditions correspond to different employment rates. Most importantly, we have to realise that within a group having the same health condition some are severely hampered, whereas others are not or only slightly. Sometimes a disease involves such severe limitations that job loss is inevitable. Often, however, work-related problems may be remedied and job loss prevented.

² These figures slightly underestimate the prevalence of chronic disease and the contribution of chronic disease to unemployment since a number of less prevalent but serious diseases, e.g. neurological diseases like multiple sclerosis or Parkinson's disease, are not taken into account in the GEDA studies.

Leitthema	Abstract · Zusammenfassung
<p>In the following sections we will explain what the consequences of a chronic disease for work functioning may be and what problems workers with a chronic disease may face. These data originate from quantitative and qualitative research. Then we will present the International Classification of Functioning, Disability and Health (ICF) as a model that explains how personal and environmental factors in addition to medical factors influence work disability. Finally, we will present a number of evaluative studies discussing various interventions aimed at the prevention of work disability.</p>	<p>Bundesgesundheitsbl 2013 · 56:406–414 DOI 10.1007/s00103-012-1621-1 © Springer-Verlag Berlin Heidelberg 2013</p> <p>I. Varekamp · F.J.H. van Dijk · L.E. Kroll</p> <p>Workers with a chronic disease and work disability. Problems and solutions</p> <p>Abstract</p> <p>The prevalence of chronic diseases in the age group 18–65 years is high. Cardiometabolic conditions and musculoskeletal diseases are the most frequent chronic diseases. Depending on disease and comorbidity, the employment rates are considerably lower than for healthy individuals. Chronically ill workers may have problems in meeting job demands, they may experience physical, cognitive or sensory limitations, have fatigue or pain complaints or other disease symptoms. Psychological distress, depressive feelings, feelings of shame or guilt, lack of coping or communicative skills, and non-supportive colleagues and supervisors may add to work-related problems. The ICF Model (International Classification of Functioning, Disability and Health) of the WHO offers a framework for understanding and considering health-related problems at work and finding solutions.</p> <p>Interventions to prevent problems in functioning, sickness absence and work disability may focus on the worker, the workplace, or health care. Multidisciplinary vocational rehabilitation, exercise therapy, cognitive behavioural interventions, workplace interventions and empowerment are interventions with at least some evidence of effectiveness. Future policy could focus more on promotion of workers' health and future research should include the interests and motivations of employers concerning disability management, skills of line managers, the feasibility of interventions to prevent work disability and the context sensitivity of study outcomes.</p> <p>Keywords</p> <p>Chronic disease · Work-related problems · Work disability · Vocational rehabilitation · Occupational health</p>
<p>Work-related problems among workers with a chronic disease</p> <p>A main challenge for workers with a chronic disease is to meet work demands, i.e. to do their job in a satisfactory way. Studies in this field demonstrate diverse figures. Recent research among Dutch workers having a chronic or long-standing disease showed that 48%, 44% and 8% of them respectively stated that they were not hampered, slightly hampered, or severely hampered in work performance [4]. In an English study on all the employees of a university, 40% of those with a chronic disease reported having a limitation in meeting work demands [5]. A large-scale American study on chronically ill workers reported that, depending on the chronic condition, 22–49% experienced problems in meeting physical work demands and 27–58% had difficulties in meeting psychosocial demands [6].</p> <p>When people function at a suboptimal level at work, what factors may account for this? In the first place, there are limitations caused by the disease such as limitations in mobility or other physical activities, sensory limitations like hearing impairment and visual handicaps or cognitive limitations. Then there are health complaints such as fatigue, pain, incontinence or other symptoms that may hinder functioning. Apart from disease symptoms and limitations, many chronically ill workers are troubled by psychological distress [7] or depression [8]. In addition, medical procedures, such as regular outpatient clinic visits</p>	<p>Chronisch Kranke im Erwerbsleben. Probleme und Lösungen</p> <p>Zusammenfassung</p> <p>Die Prävalenz chronischer Erkrankungen in der Altersgruppe der 18- bis 65-Jährigen ist hoch. Am häufigsten treten kardiometabolische Störungen und muskuloskeletale Krankheiten auf. In Abhängigkeit von der Erkrankung und Komorbidität liegen die Beschäftigungsquoten verglichen mit gesunden Personen wesentlich niedriger. Chronisch kranken Beschäftigten kann es schwer fallen, den beruflichen Anforderungen gerecht zu werden. Sie können physisch, kognitiv und sensorisch eingeschränkt sein sowie an Erschöpfung, Schmerzen oder anderen Krankheitssymptomen leiden. Psychische Belastung, depressive Verstimmungen, Scham- und Schuldgefühle, fehlende Coping- und Kommunikationsfähigkeiten wie auch mangelnde Unterstützung durch Kollegen und Vorgesetzte können die Arbeitsprobleme noch verstärken. Die International Classification of Functioning, Disability and Health (ICF) der Weltgesundheitsorganisation (WHO) bietet einen Rahmen für das Verständnis, die Berücksichtigung und die Lösung gesundheitsbedingter Probleme am Arbeitsplatz. Maßnahmen zur Prävention von Beeinträchtigungen der Funktionsfähigkeit, krankheitsbedingten Fehlzeiten und Arbeitsunfähigkeit können auf den Beschäftigten, den Arbeitsplatz oder die Gesundheitsversorgung zielen. Multidisziplinäre berufliche Rehabilitation, Bewegungstherapie, kognitive Verhaltenstherapie, Interventionen am Arbeitsplatz und Empowerment sind Maßnahmen, für deren Wirksamkeit es zumindest einige Anhaltspunkte gibt. Zukünftige Strategien könnten schwerpunktmäßig die Gesundheit der Beschäftigten fördern. In kommende Untersuchungen sollten die Belange und Motivationen von Arbeitgebern hinsichtlich der betrieblichen Wiedereingliederung („disability management“) einbezogen werden. Auch die Fähigkeiten der Vorgesetzten, die Machbarkeit von Maßnahmen zur Prävention der Arbeitsunfähigkeit und die Kontextsensitivität der Studienergebnisse gilt es zu berücksichtigen.</p> <p>Schlüsselwörter</p> <p>Chronische Erkrankungen · Arbeitsprobleme · Arbeitsunfähigkeit · Berufliche Rehabilitation · Arbeitsmedizin</p>

or self-management activities that have to be performed at work, may interfere with job demands.

Fatigue is a frequently mentioned complaint of chronically ill people [9], all the more so when they have a job [10].

Tab. 2 Employment rate^a of men and women by disease category and age (n=35,740)^b

Specific disease categories (health conditions) ^c	Men					Women						
	18–24	25–34	35–44	45–54	55–64	18–64 age-corr. mean ^d	18–24	25–34	35–44	45–54	55–64	18–64 age-corr. mean ^d
Cardiometabolic conditions	62.3	79.2	87.0	83.8	53.5	74.5	49.1	55.3	67.2	68.2	38.4	57.3
Cardiovascular disease (ever)	57.9	82.0	78.5	68.3	36.5	65.1	75.2	58.0	62.2	57.0	29.3	54.9
Lower respiratory disease	43.6	71.4	76.1	74.9	40.7	63.0	48.5	58.6	63.4	60.9	38.8	55.1
Liver/renal diseases	62.0	69.1	58.8	75.7	32.5	59.9	80.6	37.5	61.5	53.1	26.7	50.5
Musculoskeletal disease	61.3	76.3	81.1	79.1	46.9	70.0	51.5	55.0	67.6	66.8	38.9	57.4
Cancer (ever)	56.5	72.4	76.4	77.3	40.7	65.8	70.3	56.3	67.6	67.5	37.4	59.8
Depression	46.2	62.9	65.4	62.5	33.4	55.0	38.2	54.6	62.3	56.4	35.8	51.2
Severe sensory limitations	59.3	85.7	75.9	66.5	45.7	66.7	52.2	46.0	54.9	57.6	35.1	49.7
Number of diseases and conditions												
No diseases	55.4	81.0	94.2	94.4	72.3	81.8	45.3	64.5	75.6	78.0	49.5	65.3
One disease	54.7	77.9	92.7	90.8	62.7	78.0	47.0	58.9	72.7	78.8	50.1	64.2
Two or more diseases	64.9	76.5	78.8	79.9	49.8	70.8	54.9	52.4	64.6	65.8	37.6	56.1
Total	55.7	79.8	90.5	87.9	57.4	76.2	46.5	61.2	72.4	73.6	42.4	61.5
Number of persons	2,384	2,559	3,702	3,692	3,077	15,414	2,418	3,359	5,270	5,059	4,220	20,326

^aEmployment: currently in paid work, disregarding the number of hours^bData: GEDA 2009 and 2010 combined^cSubjects included in single disease categories may have another disease as well (comorbidity)^dDirect for age-corrected mean employment rates (1) per disease, (2) per number of diseases and conditions, and (3) for the total male and female population respectively; all figures are separately calculated for men and women. The age distribution of the total male and female population respectively between 18 and 65 years of age is taken as the standard age distribution. All mean figures are corrected using the two standard distributions of ages for men and women.**Tab. 3** Proportion of men and women by disease category who consider their medical condition as cause of their previous/current unemployment^a (n=6349)^b

	Men %	Women %
Specific disease categories (health conditions) ^c		
Cardiometabolic conditions	25.7	22.6
Cardiovascular disease (ever)	39.5	41.3
Lower respiratory disease	31.9	29.2
Liver/renal diseases	45.5	46.6
Musculoskeletal disease	33.2	25.7
Cancer (ever)	35.1	27.6
Depression	49.9	36.8
Severe sensory limitations	37.9	29.2
Number of diseases and health conditions		
No disease	4.7	4.5
One disease	14.9	10.9
Two or more diseases	32.9	27.0
Total	16.1	14.1

^aRespondents who experienced not working during the last 5 years^bData: GEDA 2009 and 2010 combined, age 18–65^cSubjects included in single disease categories may have another disease as well (comorbidity).

Franssen et al. [11] found that healthy workers had a mean score on the CIS fatigue scale (range 20–140) of 53, whereas workers with a chronic disease averaged 68. Another group of workers with a chronic disease who experience serious work-related problems had a mean CIS score of 89 [12]. High fatigue levels among chronically ill workers are partly due to disease and partly due to psychological distress [11].

Studies focusing on the workers' perspective on working with a chronic disease demonstrate the importance of several psychosocial aspects, including both personal characteristics and environmental factors. Support and understanding of colleagues and the supervisor is crucial according to workers themselves [7, 13, 14, 15, 16]. A negative self-image, feelings of hopelessness related to employability and inability to set limits were mentioned by workers with musculoskeletal pain [17]. Reluctance to disclose health information to others and fear that colleagues may see them as unfairly favoured was mentioned by patients with inflammatory arthritis [16]. Detaille et al. [13] found that according to workers with diabetes, rheumatoid arthritis and

hearing loss, personal skills such as good coping and self-management qualities at work are important.

Psychosocial problems are understandable when we recognise how a number of specific characteristics of chronic diseases may interfere with work performance and career opportunities. Beaty and Joffe [18] mention four characteristics of serious and irreversible chronic diseases. First, many serious chronic diseases are by definition permanent and people need to get used to reduced career prospects. Second, there is the unpredictability of the disease trajectory. For some workers, the disease progresses quickly, for others symptoms develop slowly, and for many this unpredictability gives rise to feelings of uncertainty and anxiety. Third, many diseases are characterised by a day-to-day variability of symptoms. Multiple sclerosis, rheumatoid arthritis, thyroid disease and Parkinson's disease, for instance, are illnesses that may fluctuate from day to day or from week to week. This makes work planning difficult and it may create credibility problems at work. Fourth, chronic diseases are often invisible to co-workers or the supervisor, which may contribute to

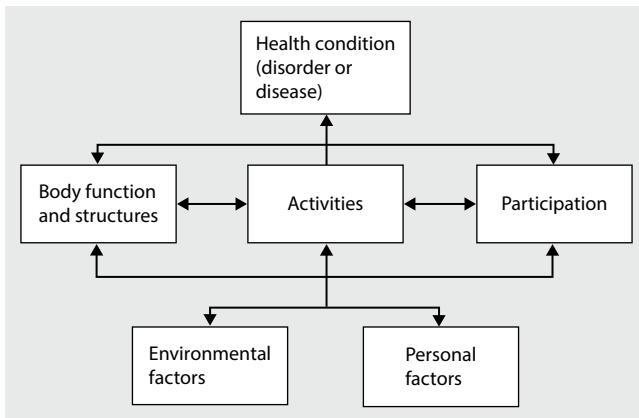


Fig. 1 International Classification of Functioning, Disability and Health (ICF) model.
(Adapted from [22]; WHO)

misunderstandings. This invisibility confronts workers with the issue of whether or not to disclose their illness. Telling others can be risky because of discrimination. On the other hand, when workers are performing worse, telling others may clarify the situation and make work accommodation possible.

In view of the diverse physical, psychological and practical consequences that chronic disease may have for functioning at work, it is no surprise that some careers end in work disability. Physical limitations, perceived health complaints, physical work tasks, a higher age and a lower educational level are factors that have been found to be predictive of work disability [19, 20], just as high fatigue levels are [21, 22].

The International Classification of Functioning, Disability and Health

The World Health Organisation developed the International Classification of Functioning, Disability and Health (ICF) as a standard framework offering a common language for the description of participation consequences of health and health-related states [22]. The ICF interprets disability and participation problems as a function of medical, psychological and social factors (Fig. 1). In this biopsychosocial model, disability is not seen as an inherent personal feature, but as an aspect of the relationship of a person with the environment. More precisely, disability is perceived as a gap between personal capabilities and demands from outside [23]. This gap can be stopped or narrowed by increasing the capabilities of

the individual or increasing support, or by changing the demands. A second characteristic of the ICF model is that personal and environmental factors are seen as important for the outcome of the disability process. Both these factors may hamper as well as support participation.

When we apply the ICF model to work disability, we see how personal and work environment factors may influence work disability. Such work environment factors as specialised computer equipment, modified furniture, adjusted break arrangements, the option of working at home, support of the supervisor and understanding colleagues have a beneficial influence on work performance, whereas environmental factors like inaccessible buildings, commuting during peak hours, lack of work autonomy or a heavy work load may have negative consequences. Personal attributes such as communicative and problem-solving capacities have a positive influence, while personal attributes like negative illness perceptions may have a negative influence. Because environmental and personal factors are often modifiable, this ICF perspective offers ways outside the strict medical sphere to prevent work disability.

Managing work-related problems of workers with a chronic disease

Prevention of work disability and management of long-term sickness absence have focused for a long time on disease factors, material work adaptations and personal factors. More recently and in line with the ICF conceptualisation and strategy, new interventions aimed at en-

vironmental and organisational factors have been explored [24]. Palmer et al. [25] summarised the evidence in this field for one disease category. They investigated the effect of 42 interventions for workers with musculoskeletal illness, the majority being low back pain. The authors distinguished between physical, psychological, social and environmental interventions directed at the worker, the workplace or health care. Person-oriented physical interventions included exercise therapy, work hardening or physical therapy. Psychological therapy was aimed at behavioural or attitudinal change. This could be general in nature, consisting of cognitive behavioural therapy, coping and relaxation, or vocationally oriented. Workplace interventions included ergonomic or psychosocial risk assessment, ergonomic changes, job modifications and education and advice for managers. Interventions aimed at the health care sector included multidisciplinary case management, consultation with an occupational physician, education of primary health care or occupational physicians, formalised agreements between them and access to extra external support and referral services. They found that most interventions were modestly beneficial, benefits being somewhat greater for workers with less than 12 weeks of sickness absence. No interventions were clearly superior, although setting graded tasks and interventions involving workplace adaptations, workplace assessments or extra external support and referral services were more beneficial. The cost effectiveness of intervention was often doubtful [25]. An exception to this was a workplace intervention combined with graded activity and intensive medical guidance by an occupational physician for workers sick-listed for long-lasting low back pain. This intervention was highly cost-effective [26].

In the remainder of this section we will describe the setup, contents and theoretical underpinning of a number of interventions, without making any claim to being exhaustive. We will restrict ourselves to those with some evidence for effectiveness, though high-quality evidence is often lacking due to an insufficient number of high quality effectiveness studies.

Occupational health care

In Germany, occupational health care is regulated by the Occupational Safety Act ("Arbeitssicherheitsgesetz", ASIG) of 1973 defining employers' duties regarding the provision of occupational safety and health services for the workers. The German Occupational Health and Safety Act ("Arbeitsschutzgesetz", ArbSchG, 1996) is the primary German law on Occupational Safety and Health and is a direct transposition of the European Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work. It defines core employer duties such as risk assessment and risk management and the provision of access to preventive occupational health services for the workers. Finally, volume VII of the Code of Social Law ("Sozialgesetzbuch VII", SGB VII) defines the statutory accident insurance institutions in the fields of prevention, rehabilitation and compensation.

According to ASIG the employer bears the responsibility for occupational health and safety (OHS) at the workplace and is obliged to obtain expert advice and support from occupational health physicians (OHP) and other OHS experts. The OHP support includes health-promoting adaptation of work, elimination of health risks as well as regular preventive health assessments of workers. According to Section 11 ArbSchG, workers suspecting occupational risks have the right to request occupational health advice. In the case of temporary or permanent disability the OHP deals with questions related to change of job as well as integration and re-integration of disabled persons into work.

Employers have to offer development and implementation of an individual rehabilitation plan to workers who are on sick leave for more than 6 weeks within a calendar year (Section 84, SGB IX, "Betriebliches Eingliederungsmanagement", BEM, organisational integration management). The OHP may contribute to plan development and implementation, but his role is not formally regulated. However, the OHP may serve as the initial contact person for the disabled worker, a function increasingly formalised in enter-

prises in social partner bargaining agreements.

Especially this recent BEM regulation has led to increased participation of OHPs in disability management in Germany in past years. Several hundred OHPs have participated in disability management courses and about half of them have formalised their qualification by taking the Certified Disability Management Professional examination.

Multidisciplinary vocational rehabilitation

In multidisciplinary vocational rehabilitation, a team of specialists, often consisting of medical and psychotherapeutic professionals are involved. For workers with chronic rheumatic diseases experiencing work-related problems the multidisciplinary treatment consisted of a systematic assessment followed by education, vocational counselling, guidance and medical or non-medical treatment. The team comprised a rheumatologist, a social worker, a physical therapist, an occupational therapist and a psychologist, with an occupational physician in an advisory role. After two years, a significantly greater improvement in fatigue complaints and emotional status was found in the experimental group, although no effect was found on job retention [27]. A Cochrane review of multidisciplinary rehabilitation for adults with multiple sclerosis found strong evidence for improvement in participation after inpatient rehabilitation and limited evidence for improvement in participation for high intensity outpatient or home-based programmes [28].

Exercise therapy and graded activity

Fitness training programmes may improve the physical condition and consequently the work capacity of a worker. For individuals with chronic low-back pain, exercise therapy appears to be somewhat effective at improving function. In adults with subacute low back pain there is some evidence that a graded activity programme improves absenteeism outcomes [29]. For workers with prolonged fatigue complaints, it was found that physical

training improved physiological parameters and had a positive effect on fatigue complaints [30].

Cognitive behavioural interventions

Negative illness perceptions are shown to have a negative influence on coping and functional adaptation and may thus have a negative impact on work disability [31, 32, 33]. Petrie et al. [34] showed that a brief hospital intervention designed to alter patients' perceptions about their myocardial infarction resulted in significant positive changes in patients' views of their condition and quicker return to work. An intervention aimed at changing illness perceptions of patients with renal failure was piloted in the Netherlands and appears promising [35].

Workplace interventions

In the last 15 years experience has been gained with workplace interventions aimed at prevention of work disability. They focus on changes in the work environment, equipment, work design, work organisation, social relationships or working conditions, in combination with occupational (case) management in which at least the worker and the supervisor or manager are stakeholders. A Cochrane review on workplace interventions found that the latter reduce sickness absence for musculoskeletal disorders, but have no effect on health outcomes [36]. In the Netherlands, Anema et al. [37] studied the effects of workplace intervention on return to work for workers sick-listed 2–6 weeks for low back pain. The intervention consisted of workplace assessment, work modifications, and case management involving all stakeholders and reduced the return to work period.

Empowerment

In the 1990s the concept of patient empowerment was adopted in health care for self-management programmes for patients with chronic diseases. In this context, empowerment is defined as a process to help patients develop knowledge, skills and an awareness of their values and

needs in order to enable them to take responsibility for their medical treatment and increase their autonomy [38, 39]. The empowerment concept has also been applied to vocational rehabilitation interventions for workers with a chronic disease [40]. Notably in the context of outpatient care, various job retention programmes have been developed and evaluated for chronic conditions such as diabetes, rheumatoid arthritis and renal failure [41]. Better communication and improved problem-solving capacities and adequate negotiations for work accommodations are important components of these programmes. In the Netherlands, an intensive programme consisting of group and individual sessions was developed for workers with major depression. Although it did not improve depressive complaints, it was found to reduce work loss days, without increasing work stress [42]. A somewhat lighter group training programme was developed for workers with a variety of somatic chronic conditions. It was aimed at clarifying practical and psychosocial problems at work and better communication with the supervisor and colleagues in order to solve work-related problems. In a randomised controlled trial, this programme was found to have a positive effect on self-efficacy and fatigue complaints, but not on job satisfaction or job retention [12].

Future challenges

In this section we will address the issue of what workers, employers, health care and research can do to prevent work disability of workers with a chronic disease.

At the beginning of this article we made a distinction between common health problems and severe chronic diseases. The most prevalent disease categories in the labour force are cardiometabolic conditions and musculoskeletal conditions that are not life-threatening progressive diseases for a large majority if no serious comorbidity exists. In many cases, e.g. involving nervous exhaustion and low back pain, getting healthier will greatly help workers in dealing with the consequences of these diseases. Many diseases may be remedied or prevented through a healthier lifestyle. In other cas-

es, such as moderate hypertension, diabetes that is well under control or rheumatoid arthritis in an early phase, work activities are not hindered very much at the beginning of the course, contrary to the situation when co-morbidity and serious complications are present. For severe chronic diseases that are progressive or cause serious limitations or include medical interventions with a high impact, an important task for workers is to find out whether continuation of work leads to physical or psychosocial problems, whether there are negative influences on functioning and performance, and how these can be remedied with work accommodation or other solutions. Many can manage this process on their own, a number of others need help with this, and sometimes work may be beyond the respective personal capacity. We have to keep in mind that a simple dividing line between common health problems that workers need to take care of themselves and serious chronic conditions that require expert support and work adaptations does not exist.

Common health conditions like chronic low back pain may demand comprehensive work adaptation. On the other hand, workers with serious chronic diseases may demonstrate defensive reactions to symptoms, inspired by too negative illness perceptions. One determinant of the need for more professional support is the seriousness of the disease in terms of a life-threatening, incurable and disabling disease. But also the workers' professional and coping skills, the physical and mental demands of the job and available social support from colleagues, supervisors and managers are important.

What can employers do, apart from offering lifestyle programmes at work? Several studies have shown the importance of line manager support for workers with a chronic disease and the success of workplace-based interventions addressing work accommodation and improved communication between workers and line managers. Recent research among a selected group of line managers revealed factors that the line managers themselves consider important in order to deal satisfactorily with workers having a chronic disease:

- good cooperation between manager and worker and mutual trust are necessary,
- the line managers themselves need appropriate knowledge of how chronic illness can affect work,
- the workers should take responsibility themselves, which means that they should make their own decisions, be open about their condition and be aware of the limitations and capabilities of their colleagues and
- work should be accommodated to the condition and needs of the worker.

Human resource managers added to this list the necessity of a company policy concerning disability [43]. These are highly ambitious goals formulated by managers committed to their workers. In reality we have an increasingly globalised labour market with more work stress, less job security [44], and sometimes work accommodation may be difficult to organise, for instance because there is no opportunity for alternative duties [45]. Up to now little attention has been paid to the motivations, interests and concerns of employers or managers [46]. Research on demand-side factors related to hiring and keeping workers with disabilities shows some positive attitudes to workers with a chronic condition, but also ambivalence about their productivity [47]. More research is urgently needed on the opinions and attitudes of owners of small and medium-sized enterprises, and the supervisors, managers, HR advisors and CEOs of large companies.

The third issue is what health care can do. In general, workers with a chronic condition see their medical specialist, nurse practitioner or general physician more often than the occupational physician. Nevertheless, problems concerning work performance are seldom discussed in the health care setting. In a study on workers with musculoskeletal disorders on sick leave, it appears that visiting a medical specialist delays the return to work, whereas a physical therapist has a speeding-up influence and a general physician does not influence the duration of sickness absence [48]. Curative health care professionals should realise that they can contribute to timely return to work by dis-

cussing work-related problems and cooperating properly with occupational health care [49]. A noteworthy trend in Germany is that medical rehabilitation increasingly addresses work-related issues and tries to incorporate not only physical, but also psychosocial aspects of work functioning in diagnostics and therapy [44]. A point of particular interest for health care workers, be they curative health care professionals or occupational physicians, is the mental health of their patients. Depression is one of the health conditions with a rather high prevalence and strongly correlated with employment. We also know that individuals with a chronic physical disease are frequently troubled by depression as well. If depressive symptoms are not addressed, it is very difficult for workers to retain their job.

Conclusion

What research approaches are promising? Most research in the field of work disability prevention has been done on workers with one specific chronic disease, in the majority of cases a musculoskeletal disease. Recently, researchers have broadened their focus in order to investigate whether similar approaches may be useful for a variety of diseases [24]. By taking into account environmental and organisational factors, this means that a wealth of knowledge becomes available. However, results may be difficult to interpret and compare or integrate. Effectiveness studies apply a wide range of intermediate measures, such as self-efficacy in return to work, functional and coping capacities and availability of work accommodation. A variety of outcome measures are applied, including job retention or return to work, sickness absence, presenteeism, work performance or work functioning, recovery after work, health status or symptoms like fatigue. Given the impact of interpersonal behaviour, culture and underlying organisational factors, a serious problem of the generalisability of study outcomes rises. As an example, senior management support for workers' and line managers' behaviour can vary considerably and these factors

are difficult to manage or control in randomised controlled trials (RCTs). On top of that, many studies evaluate interventions consisting of a mixture of components, which makes it difficult to assess what works and why [45]. According to some, only a mix of measures works: the multifaceted approach. There are several solutions for all these research complexities. One solution is to strive for a number of widely accepted intermediate and outcome variables internationally, in addition to providing in each study sufficient information about contextual factors to inform the potential users of the generalisability of study results, and to perform process evaluations which may help to interpret the meaning of findings, especially when programme failures may explain the study results.

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Fachnachrichten

BAuA veröffentlicht Internet-Landkarte zu Ambient Intelligence

Die Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) hat eine Forschungslandkarte veröffentlicht, die Projekte zu Ambient Intelligence (Aml) und Adaptiven Arbeitsassistsenzsystemen (AAS) übersichtlich darstellt. Das Online-Angebot unter www.ami-map.de katalogisiert damit Aktivitäten und Forschungsstand im Bereich von neuen Technologien in der Arbeitswelt – beispielhaft sind Daten- und Videobrillen, smarte Schutzkleidung, adaptive Umgebungssteuerungen oder intelligente Mensch-Maschine-Interaktionen. Ziel der digitalen Karte ist es, blinde Flecken in der Forschungslandschaft zu finden, geeignete Kooperationspartner zu suchen sowie Planung und Koordinierung von Forschung und Entwicklung zu vereinfachen. Das Angebot richtet sich an Hochschulen, forschende Einrichtungen in privater und öffentlicher Hand oder andere öffentliche Einrichtungen sowie Unternehmen mit eigener Entwicklung und Fachexperten. Mit ihrem Forschungsschwerpunkt „Neue Informations- und Kommunikationstechnologien in der Arbeitsumgebung“ leistet die BAuA wichtige Grundlagenarbeit im Hinblick auf die Chancen und Risiken neuer Technologien.

Quelle: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund,
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