European Agency for Safety and Health at Work

Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU

National report: Germany

European Agency for Safety and Health at Work

Authors: Tina Dauber (BIT) and Iñigo Isusi (IKEI).

Project management: Lorenzo Munar (EU-OSHA).

This report was commissioned by the European Agency for Safety and Health at Work (EU-OSHA). Its contents, including any opinions and/or conclusions expressed, are those of the author(s) alone and do not necessarily reflect the views of EU-OSHA.

Cataloguing data can be found on the cover of this publication

Luxembourg: Publications Office of the European Union, 2019

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Summary

Prevalence of MSDs

- The percentage of German men and women workers reporting that their work affects their health is slightly lower (37 % and 32 %, respectively) than the average levels for the 28 EU Member States (EU-28) (39 % and 35 %, respectively).
- The percentage of German workers affected by back pain, muscular pain in the shoulders, neck and/or upper limbs and muscular pain in the lower limbs is lower than the EU-28 average, particularly in the case of muscular pain in the lower limbs.
- Available national data show that the presence of work-related musculoskeletal disorders (MSDs) is relatively high for some pathologies. Thus, in 2012 up to 48.5 % and 46.3 % of German employees were affected by neck/shoulder pain and lower back pain during work in the past 12 months, respectively. Meanwhile, pain in other body parts such as the knees, arms, legs or hands affects between 16 % and 21 % of the working population. In addition, the data show that a very high percentage of the people affected are undergoing medical treatment not necessarily related to MSDs.
- In 2014 a total of 1,240 occupational MSDs were recognised out of a total of 36,425 recognised occupational diseases (approximately 3 % of the total). In addition, in 2014 there were 10,009 claims to have diseases and disorders recognised as MSDs, which means that approximately 12 % of claimed MSDs were recognised as occupational diseases. Only 3 cases of occupational diseases were recognised per 100,000 insured people. Between 2007 and 2014, there was a small increase in the number of recognised MSDs. The largest proportion of cases is attributed to neurological disorders (617 out of the 1,240 cases), followed by osteoarticular disorders (342 cases).

Impact of MSDs

- With regard to the costs and other burdens related to MSDs, the available data on disability-adjusted life years (DALYs) show that the number of years of life lost and lived with disability resulting from work-related MSDs per 100,000 workers represents a higher percentage of the total number of years of life lost and lived with disability due to other reasons (cancer, circulatory problems, injuries, etc.) than the EU-28 average.
- Based on national data, in 2016 MSDs accounted for EUR 17.2 billion (1,000 million) in lost production (cost of lost production based on labour costs) and EUR 30.4 billion in lost gross added value (loss of labour productivity), which represents 0.5 % and 1.0 % of Germany's gross domestic product (GDP), respectively. The manufacturing sector suffered the highest economic losses attributable to from MSDs, followed by the public sector and other service providers, including education and health.
- Musculoskeletal and connective tissue disorders are the second most important underlying reason for new health-related retirement pensions because of reduced working capacity in Germany, after psychological/behavioural disorders, and the incidence increased between 2014 and 2016.
- Available data show that a lower percentage of people in Germany have reported a period off work as a result of a work-related health problem resulting in sick leave than the average level for the EU-28.

- National data offer interesting information on the number of sick leave days taken. Comparing the causes of incapacity for work between men and women reveals different patterns. Thus, data for 2016 show that musculoskeletal and connective tissue disorders are the main reason behind taking sick leave days among men (26.0 % of the total) and the second most common reason among women (22.5 % of the total).
- National data also provide information on MSD-related sick leave. According to the data, the average number of MSD-related sick leave days is 5.5 days, but this figure is higher in specific sectors (particularly the food and beverage industry, metal manufacturing, and transport and storage) and among men and workers who are 45 years old or older.
- Compared with the EU average, a much higher percentage of German employees work in companies where support is provided to employees to return to work after long-term sickness.

Risk factors for MSDs

- A large percentage of German employees are exposed to physical factors at work that may put them at risk of MSDs. More precisely, the most important physical risks factors are jobs involving standing, working in sitting positions and working with computers/laptops. Other relatively important physical risks include repetitive hand/arm movements and working in tiring/painful positions. A comparison with EU-level data shows that the relative importance of the various physical risk factors is similar in Germany and in the EU-28, with the exception of the risk linked to repetitive hand/arm movements (which is less relevant in Germany).
- German national data show that MSDs are the most frequent reason for taking sick leave. The data also show that there has also been an increase in the number of sick leave days taken due to MSDs. Comparing men and women, men accumulate significantly more sick leave days due to MSDs than women. Back pain is the main MSD-related problem, and it is more frequent among men than women. Finally, age is a factor that increases the number sick leave days taken and the number of sick leave days due to MSDs (for both men and women).
- Interesting national research shows that having little space for working is the risk with the highest probability of resulting in an MSD-related inability to work, followed by a stressful working environment, physical stress and heavy work.
- Working frequently in an upright position, repetitive work processes and working with the hands are very common in Germany. Some specific working conditions are particularly likely to lead to MSDs, such as lifting and carrying heavy loads, exposure to vibration and waves or working in a constrained posture.
- Organisational and psychosocial risk factors also play a role as potential triggers of MSDs. The most relevant factors among German employees are the pace of work being dependent on other people's demands, tight deadlines and working at very high speed. Other relatively important risks include the pace of work being dependent on the manager or, generally speaking, difficulties with sleep. A comparison with EU-level data shows that the most relevant organisational and psychosocial risk factors are much the same in Germany as in the EU-28. The available data show that German employees are less exposed than their EU counterparts to many of the risks identified.
- National data show that temporary agency workers are much more likely to be exposed to physically demanding working conditions or difficult environmental conditions. As a result, pain in the knees, neck pain/shoulder pain or lower back pain are more frequently reported among temporary workers than among non-temporary workers.
- Other national data show that the higher an employee's educational or occupational level, the fewer days' absence due to MSDs taken. In addition, sick days due to MSDs are more prevalent in very physically demanding occupations (e.g. in manufacturing and construction). Moreover,

employees in supervisory or managerial positions have less absenteeism due to illness than other skilled employees, and this is particularly evident for MSDs. Finally, the number of sick leave days per 100 part-time workers is lower than the average for all those employed (full and part-time), but the number of days per absence is slightly higher.

Prevention of MSDs

- Surveys of enterprises suggest that the percentage of German employees working in establishments where preventive measures regarding MSDs are in place is slightly lower than or similar to the EU-28 average (with the exception of equipment to help with lifting or moving heavy loads). In addition, a relatively high percentage of German employees work in establishments where training on certain preventive activities is provided, particularly in the cases of how to lift and move heavy loads correctly and of the proper use and adjustment of work equipment. In the first case, a comparison with the EU-28 average shows that more training on lifting and moving heavy loads is provided in Germany than in the EU as a whole.

1 Introduction

1.1 Background

This is the national musculoskeletal disorders (MSDs) facts and figures overview report for Germany ([1]). This national report is part of a much larger project, '**MSDs facts and figures overview: prevalence, costs and demographics of MSDs in Europe**', intended to support policy-makers at EU and national levels by providing an accurate picture of the prevalence and costs of MSDs across Europe, pulling together existing data from a number of relevant and reliable official statistical sources. This national report is considered complementary to the overview report covering the EU as a whole, *Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU – Final report* ([2]).

The European Agency for Safety and Health at Work (EU-OSHA), aware of the limits of EU data sources related to MSDs, decided to complement and enrich EU-level findings with national data and analyses. This national report is not intended to provide a comprehensive and exhaustive national overview of MSDs. Rather, the main criteria followed in relation to gathering national data were to identify and focus on national MSD-related information that is either not available at EU level or complementary to existing data. Moreover, EU-OSHA considers that making the information/data identified at national level accessible to the European occupational safety and health (OSH) community and Member States (by publishing it in English) is also important. By sharing this national data at EU level, EU-OSHA aims to improve knowledge on the MSD topic among policy-makers, OSH professionals and national authorities in general.

This national report is structured into five chapters, including this introductory chapter, Chapter 1. Chapter 2 presents some data on the prevalence of MSDs among national workers, as well as information on MSD-related occupational diseases. Chapter 3 analyses the impact of MSDs, presenting information on health, work and employment outcomes (including information on costs linked to MSDs). Chapter 4 identifies several risk factors underpinning MSDs, including physical as well as organisational/psychosocial and sociodemographic risk factors. Chapter 5 provides some information related to activities carried out by enterprises/establishments intended to prevent MSDs within the workforce, including training and support activities to help workers returning to work. Finally, the report lists the main national data sources on MSDs along with (when possible) links through which this information can be accessed. All chapters follow the same structure: each chapter presents national data on MSDs based on EU-level data sources and these data are subsequently complemented with information from national data sources (if any). This has been done to ensure that all reports contain a minimum level of basic information, harmonised for all the Member States analysed.

The structure of this national report is the same as that of the general European overview report (mentioned above), and readers are invited to consult the information available in the equivalent chapter of the general European report for a more comprehensive overview of the issues addressed in this national report.

From a methodological perspective, the information presented in this report comes from national data sources based either on surveys or on administrative data related to the issue of MSDs. This national information has been complemented in some cases with information from European/international data sources to allow comparisons between national and EU-level results.

([1]) Information about the occupational safety and health system in Germany is available at: https://oshwiki.eu/wiki/OSH_system_at_national_level_-_Germany

([2]) This report is available at: https://osha.europa.eu/en/publications/msds-facts-and-figures-overview-prevalence-costs-and-demographics-msds-europe/view

1.2 Causes and consequences of MSDs: a framework

1.2.1 Main sources of information on MSDs

MSDs refer to impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves, cartilage, bones and the localised blood circulation system (EU-OSHA, 2002) ([3]). If MSDs are caused or aggravated primarily by work and by the effects of the immediate environment in which work is carried out, they are known as work-related MSDs.

The two main sources of information and data regarding MSDs are surveys based on self-reporting and administrative data.

In the case of self-reporting, people are asked whether or not they suffer from an MSD (either in general or a specific type of MSD). When assessing the prevalence of MSDs through surveys, it is customary to ask about the part of the body affected by health complaints and not about the clinical nature of complaints.

Questions regarding the prevalence of MSDs are included in different surveys. The formulation of the questions used varies between surveys and also between different waves of these surveys. These differences are likely to result in different outcomes.

Another important source of information is administrative data. Two examples of available administrative data are:

- data on the number (and proportion) of occupational diseases recognised to be due to diseases of the musculoskeletal system and connective tissue;
- data on declared work-related accidents.

Estimates of MSD prevalence based on self-reporting may include people with relatively mild health complaints as well as people with severe health complaints. Statistics based on administrative data are likely to include only people with more severe health complaints (severe enough to result in the complaint being recognised as an occupational disease).

1.2.2 A multidimensional model of MSDs

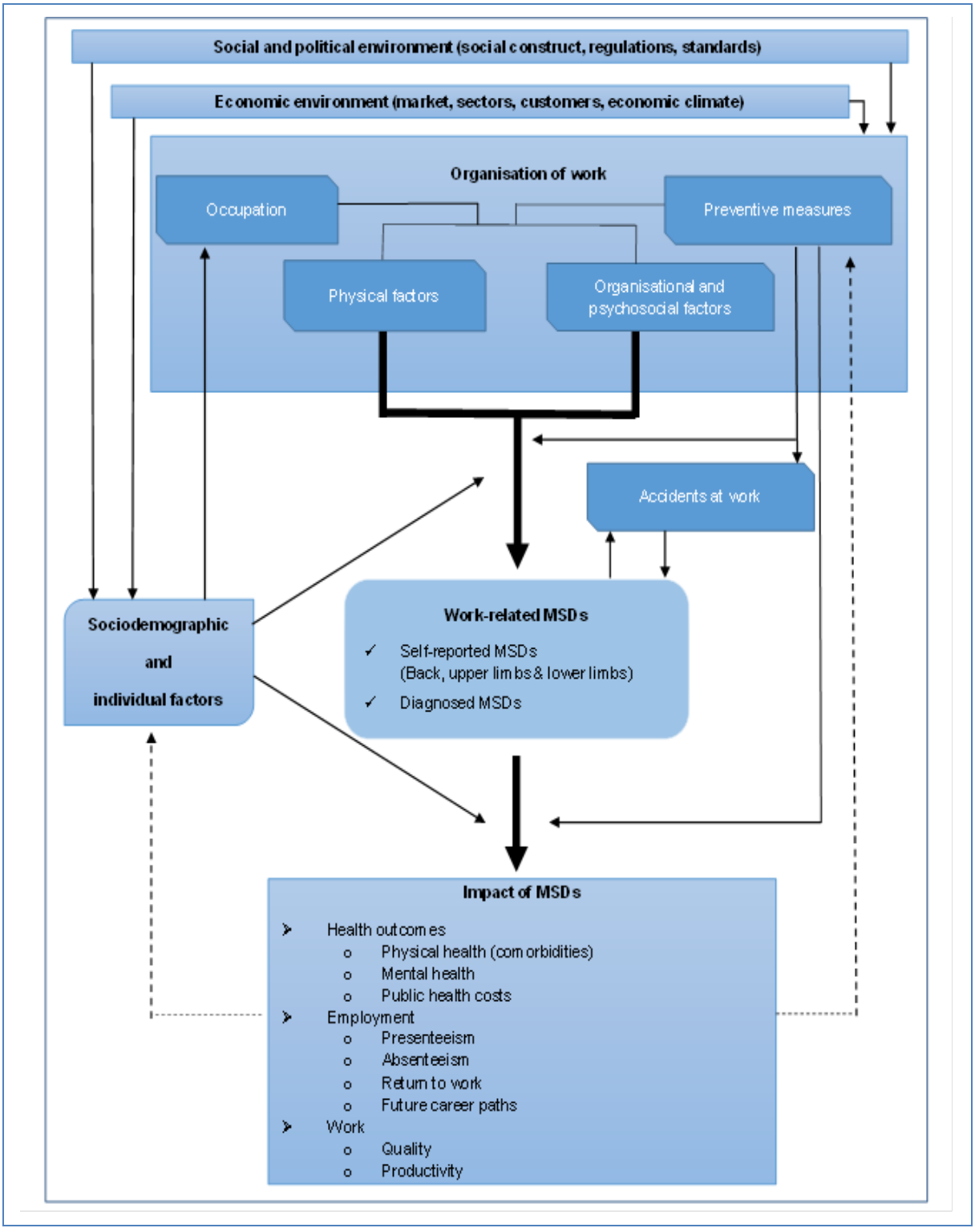
MSDs can be caused by many different (combinations of) factors and may have many different consequences. Figure 1 shows the main causes and consequences of MSDs that have been identified in previous studies.

The objective of this national report is to present additional country-specific information regarding the following aspects of the framework depicted in Figure 1:

- the prevalence of MSDs;
- the impact of MSDs;
- risk factors for MSDs;
- the prevention of MSDs.

([3]) EU-OSHA — European Agency for Safety and Health at Work, 'Introduction to work-related musculoskeletal disorders', *Facts 71*, 2002. Available at: https://osha.europa.eu/sites/default/files/publications/documents/en/publications/factsheets/71/Factsheet_71_-_Introduction_to_work-related_musculoskeletal_disorders.pdf

Figure 1: Theoretical framework of work-related MSDs



Note: Theoretical framework developed by Panteia, vhp performance and IKEI

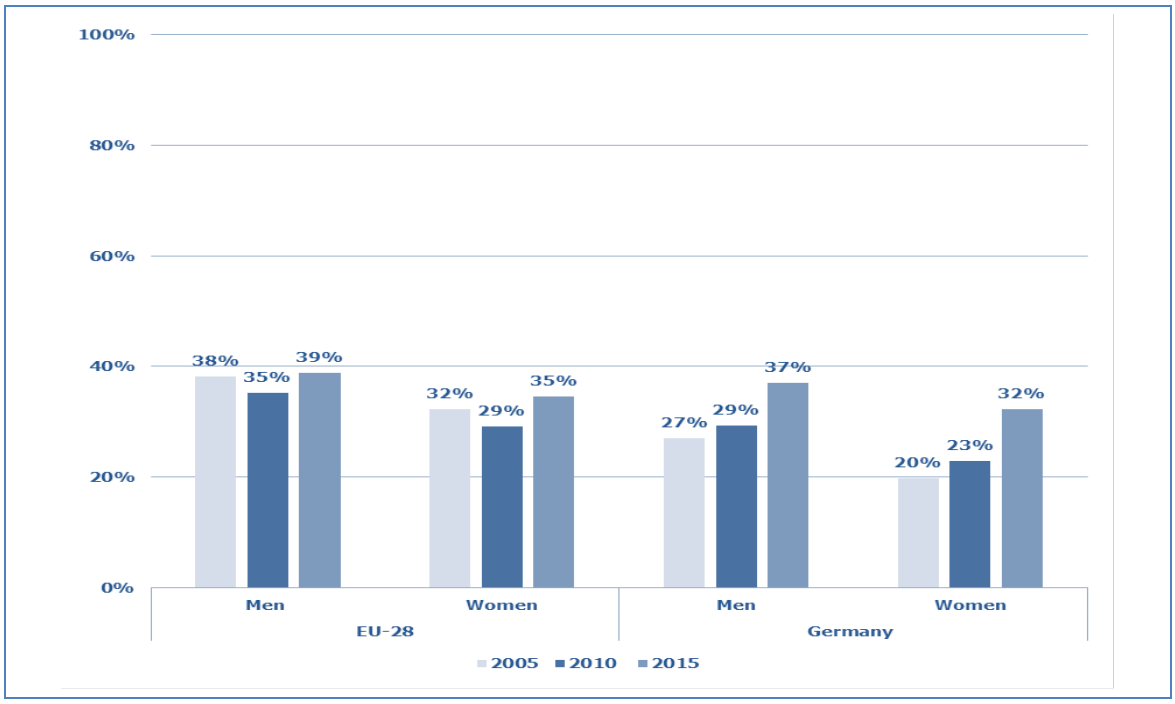
2 Prevalence of MSDs

2.1 Self-reported MSDs

In this chapter, an overview of the prevalence of MSDs in Germany and in comparison with the EU-28 is presented.

First, Figure 2 illustrates the percentages of workers, by gender, in Germany who report that their work affects their health. Around 37 % of men and 32 % of women report that their work affects their health (data for 2015); both percentages are lower than the EU-28 averages (39 % and 35 %, respectively).

Figure 2: Percentages of workers who reported that their work affects their health in the EU-28 and Germany, by gender, in 2005, 2010 and 2015



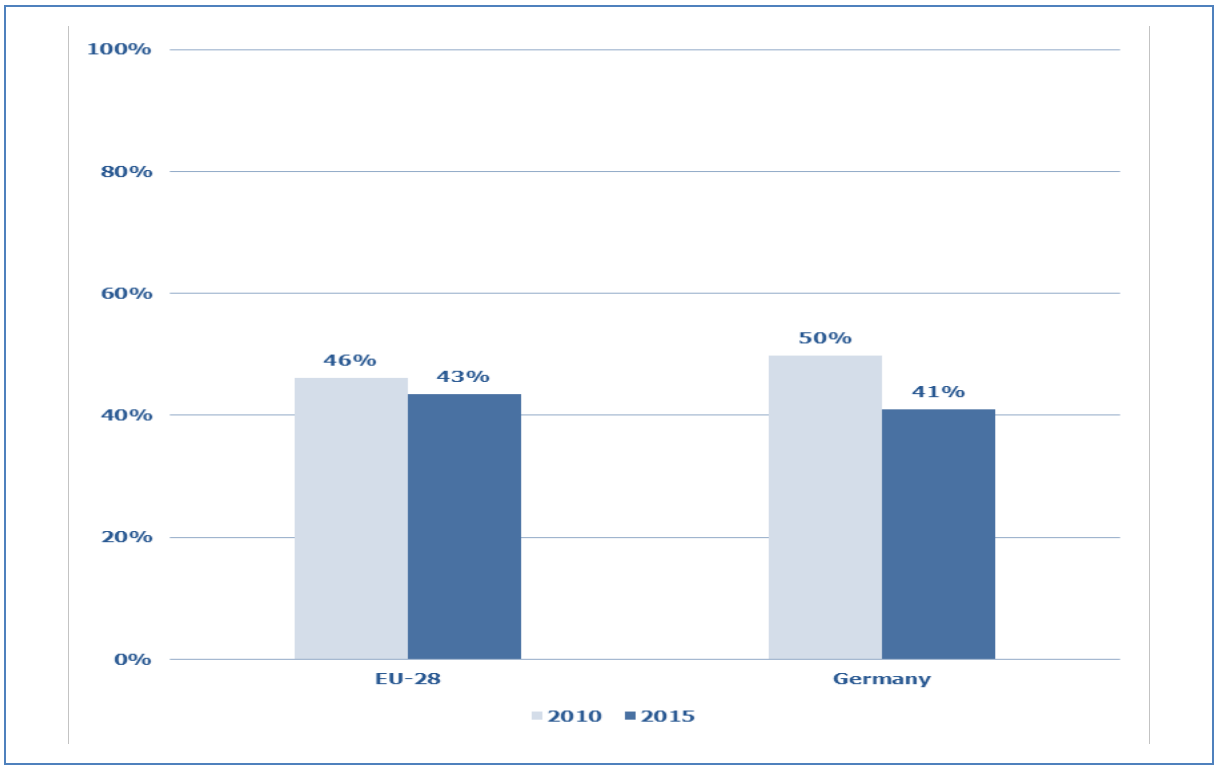
Source: Panteia, based on data from the 2005, 2010 and 2015 waves of the European Working Conditions Survey (EWCS) ([4])

The main focus is on three specific categories of MSDs, namely back pain, muscular pain in the upper limbs and muscular pain in the lower limbs.

Figure 3 shows the percentages of workers who reported back pain in the past 12 months in the EU-28 and in Germany. According to the available information, back pain is less prevalent in Germany than in the EU-28 (according to 2015 data), with 41 % of workers affected (43 % in the EU-28). However, in 2010 the percentage affected in Germany was higher than the EU-28 average (50 % and 46 %, respectively).

([4]) Eurofound — European Foundation for the Improvement of Living and Working Conditions, EWCS. Information about the survey is available at: https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys

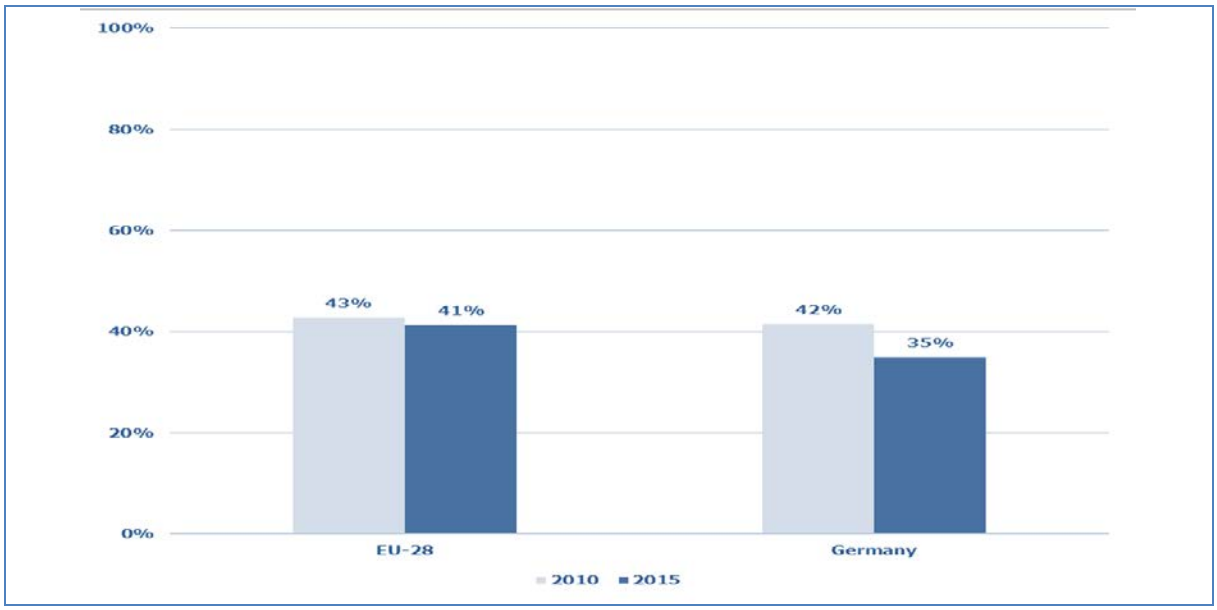
Figure 3: Percentages of workers who reported back pain in the past 12 months in the EU-28 and Germany, in 2010 and 2015



Source: Panteia, based on data from the 2010 and 2015 waves of the EWCS

Figure 4 illustrates the percentage of workers who reported muscular pain in the shoulders, neck and/or upper limbs in the past 12 months in the EU-28 and Germany. According to the available data, the percentage of German workers reporting this type of muscular pain was 35 % in 2015, which was lower than the figure for the EU-28 (41 %). In Germany, the number of people affected decreased considerably between 2010 and 2015 (42 % in 2010), whereas the EU-28 results remained stable.

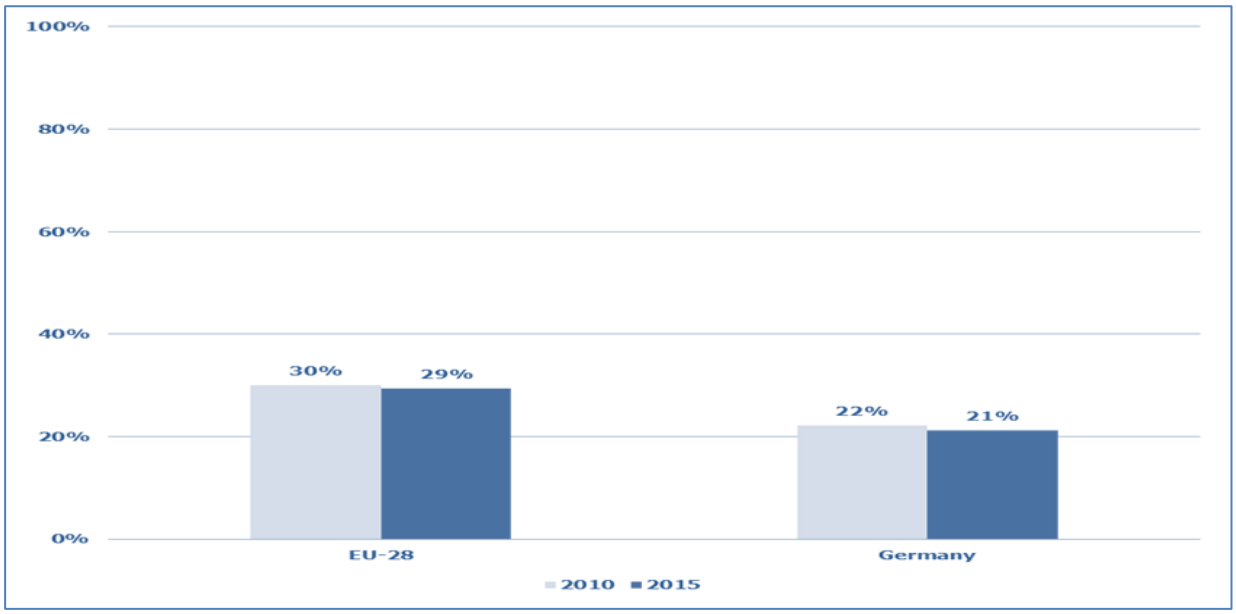
Figure 4: Percentages of workers who reported muscular pain in the shoulders, neck and/or upper limbs in the past 12 months in the EU-28 and Germany, in 2010 and 2015



Source: Panteia, based on data from the 2010 and 2015 waves of the EWCS

Finally, Figure 5 presents the percentages of workers who reported muscular pain in the lower limbs in the past 12 months in the EU-28 and in Germany. The available data show that the percentage of German workers reporting being affected by this type of muscular pain was 21 % in 2015, which was well below the figure for the EU-28 (29 %). There were no significant differences in the percentages of people affected between 2010 and 2015.

Figure 5: Percentages of workers who reported muscular pain in the lower limbs in the past 12 months in the EU-28 and Germany, in 2010 and 2015



Source: Panteia, based on data from the 2010 and 2015 waves of the EWCS

National data obtained from the Federal Institute for Occupational Safety and Health (BAuA) ([5]) provides information on the percentages of employees affected by MSDs during work in the past 12 months. According to the Federal Institute for Vocational Education and Training (BIBB)/BAuA Employee Survey 2012 ([6]), 48.5 % of employees were affected by neck and shoulder pain and 46.3 % by lower back pain. Moreover, 21.4 % suffered from pain in the knees, 21 % from pain in the arms, 19.8 % from pain in the legs or in the feet, 15.6 % from pain in the hands, and 11.5 % from pain in the hips. In addition to this, the percentage undergoing medical treatment (not necessarily related to the MSD-related pain) among those suffering from lower back pain was 53.9 %, among those suffering from neck and shoulder pain was 50.7 % and among those with pain in the hips was 46.2 % (see Table 1).

Table 1: Percentages of employees affected by MSDs during work in the past 12 months and percentage of them undergoing medical treatment because of MSDs, by type of MSD, 2012

Type of MSD	Employees affected	Employees undergoing medical treatment (*)
Lower back pain	46.3	53.9
Neck and shoulder pain	48.5	50.7
Pain in the arms	21.0	40.3
Pain in the hands	15.6	35.8
Pain in the hips	11.5	46.2
Pain in the knees	21.4	38.9
Swollen legs	10.4	33.3
Pain in the legs or feet	19.8	31.4

(*) Responses only for those employees affected by an MSD

Source: BIBB/BAuA Employee Survey 2012

2.2 MSD-related occupational diseases

Available national data ([7]) on MSDs reported and recognised as occupational diseases show that in 2014 there were a total of 1,240 recognised cases out of a total of 36,425 (approximately 3 % of the total). In addition, in 2014 there were 10,009 claims to have diseases and disorders recognised as MSDs, which means that approximately 12 % of claimed MSDs were recognised as occupational diseases. Only 3 cases of occupational diseases were recognised per 100,000 insured people.

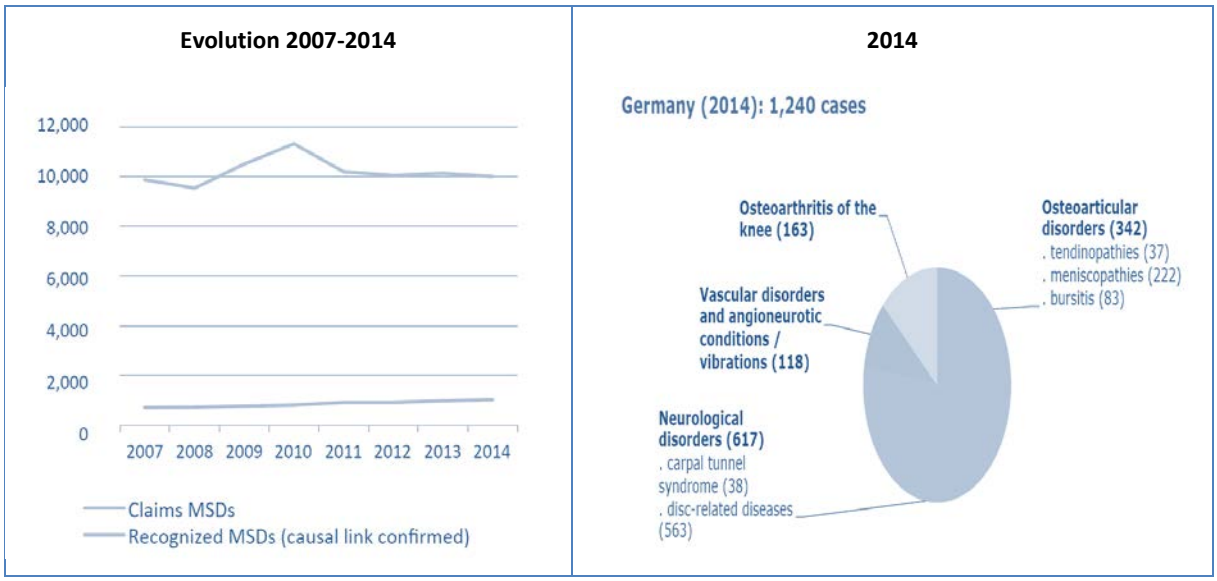
([5]) BAuA (www.baua.de) is a federal authority within the Federal Ministry of Labour and Social Affairs (Bundesministerium für Arbeit und Soziales, BMAS). As a departmental research institution of the federal government, it is responsible for all matters involving occupational safety and health at work, including the adjustment of working conditions to people's needs. BAuA publishes a lot of research reports on many safety and health-related issues. One of the long-term research topics within BAuA is the prevention of work-related diseases of the musculoskeletal system, as they are the most common cause of sickness absence, severe disability, limited capability at work and premature incapacity for work in Germany. MSDs also account for a significant part of compensation awards for occupational diseases.

([6]) Federal Institute for Employment Protection and Occupational Medicine (BAuA) & Federal Institute for Vocational Training (BIBB), Basic evaluation of the BIBB/BAuA employee survey 2012 focusing on working conditions, work-related strains and physical discomfort, 2012 (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) & Bundesinstitut für Berufsbildung (BIBB), *Grundauswertung der BIBB/BAuA-Erwerbstätigenbefragung 2012)*. Available at: https://www.baua.de/EN/Topics/The-changing-world-of-work-and-occupational-safety-and-health/Monitoring-working-conditions/Working-conditions/BIBB-BAuA-2012.html

([7]) Information obtained from Eurogip, *Musculoskeletal disorders: What recognition as occupational diseases? A study on 10 European countries*, 2016. Available at: https://www.eurogip.fr/en/news/4427-msds-what-recognition-as-occupational-diseases-in-europe

From a time trend perspective, available data for the period from 2007 to 2014 show a small increase in the number of recognised MSDs, and the largest proportion of cases are attributable to neurological disorders (617 out of the 1,240 cases), followed by osteoarticular disorders (342 cases) (see Figure 6).

Figure 6: Evolution of claimed and recognised MSDs and distribution of MSD cases recognised as occupational diseases, Germany, 2014



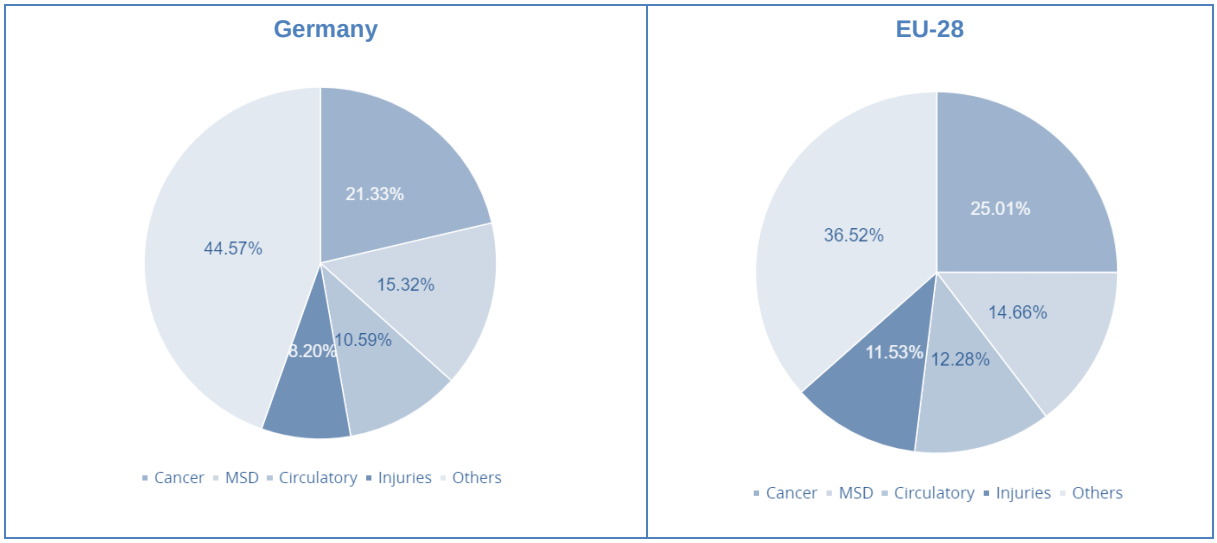
Source: Eurogip, 2016.

3 Impact of MSDs

3.1 Health outcomes

With regard to costs and burdens related to MSDs, the available data ([8]) on DALY ([9]) rates ([10]) show that the number of years of life lost and lived with disability resulting from work-related MSDs represent 15.32 % of the total number of years of life lost and lived with disability due to other reasons (cancer, circulatory, injuries, etc.), which is higher than the EU-28 average (14.66 %) (see Figure 7).

Figure 7: Distribution of years of life lost and lived with disability (DALYs) per 100,000 workers, by main work-related illnesses, in Germany and the EU-28, 2017



Source: Panteia, based on EU-OSHA, data visualisation, 'The economics of occupational safety and health', 2017). Available at: https://visualisation.osha.europa.eu/osh-costs#!/eu-analysis-illness

In addition, BAuA provides national data on the losses of production and gross added value by different diagnosed disease groups. Among all diagnosed disease groups considered, MSDs represent the highest costs ([11]). Losses of EUR 17.2 billion (1,000 million) in lost production (cost of lost production based on labour costs) and EUR 30.4 billion in lost gross added value (loss of labour productivity) arise due to diseases of the musculoskeletal system, which represent 0.5 % and 1.0 % of German gross domestic product (GDP), respectively (data for 2016). Therefore, MSDs have the greatest potential for prevention. The diagnosis group 'mental and behavioural disorders' accounts for the second highest losses with EUR 21.5 billion in lost gross added value and EUR 12.2 billion in lost production (see Table 2).

([8]) EU-OSHA, data visualisation, 'The economics of occupational safety and health', 2017. Available at: https://visualisation.osha.europa.eu/osh-costs#!/eu-analysis-illness

([9]) EU-OSHA, data visualisation, 'The economics of occupational safety and health', 2017. Available at: https://visualisation.osha.europa.eu/osh-costs#!/eu-analysis-illness

([10]) A DALY is the sum of years of life lost (YLL) because of work-related death and years of life lived with disability (YLD) due to work-related injury and illness. DALY rate refers to DALYs per 100,000 workers.

([11]) Federal Institute for Occupational Safety and Health (BAuA), Safety and health at work - Report 2016, Work- accident prevention report (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA), *Sicherheit und Gesundheit bei der Arbeit: Berichtsjahr 2016, Unfallverhütungsbericht Arbeit*). Available at: https://www.baua.de/EN/Service/Publications/Report/Suga-2016.html

Table 2: Losses of production and gross added value by different diagnosed disease groups in Germany, 2016

Diagnosed disease groups	Sick days		Loss of production		Loss of gross added value	
	Million	%	EUR (billion)	% of national GDP	EUR (billion)	% of national GDP
Psychological/behavioural disorders	109.2	16.2	12.2	0.4	21.5	0.7
Disorders of the circulatory system	35.4	5.2	3.9	0.1	7.0	0.2
Disorders of the respiratory system	91.2	13.5	10.2	0.3	18.0	0.6
Disorder of the digestive system	35.1	5.2	3.9	0.1	6.9	0.2
Musculoskeletal and connective tissue disorders	154.0	22.8	17.2	0.5	30.4	1.0
Injury, poisoning and accidents	69.8	10.3	7.8	0.2	13.8	0.4
Other illnesses	179.8	26.7	20.0	0.6	35.5	1.1
Total	**674.5**	**100.0**	**75.2**	**2.2**	**133.1**	**4.2**

Source: Federal Institute for Occupational Safety and Health (BAuA), Safety and health at work - Report 2016, Work- accident prevention report (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA), *Sicherheit und Gesundheit bei der Arbeit: Berichtsjahr 2016, Unfallverhütungsbericht Arbeit*). Available at: https://www.baua.de/EN/Service/Publications/Report/Suga-2016.html

By economic sector, manufacturing suffers the highest economic losses arising from MSDs, with EUR 6.45 billion in lost production and EUR 10.63 billion in lost gross added value. The manufacturing sector is followed by the public sector and other service providers, including education and health, where the lost production equates to EUR 5.43 billion and the lost gross added value to EUR 6.69 billion (see Table 3).

Table 3: Economic losses arising from MSDs in Germany, by economic sector, 2016

Economic sector	Sick days		Loss of production (EUR billion)	Loss of gross added value (EUR billion)
	Million	% (*)		
Agriculture, forestry and fisheries	1.5	25.9	0.09	0.11
Manufacturing	43.2	26.9	6.45	10.63
Construction	11.2	28.7	1.23	1.69
Trade, transport, hospitality, information and communication	43.8	24.1	4.26	6.30
Finance, insurance and business services, real estate and housing	17.0	18.1	1.84	4.53
Public sector and other service providers, including education and health	53.1	22.3	5.43	6.69

(*) In relation to each specific sector

Source: Federal Institute for Occupational Safety and Health (BAuA), Safety and health at work - Report 2016, Work- accident prevention report (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA), *Sicherheit und Gesundheit bei der Arbeit: Berichtsjahr 2016, Unfallverhütungsbericht Arbeit*). Available at: https://www.baua.de/EN/Service/Publications/Report/Suga-2016.html

In addition, there are other sources or relevant national data. The BKK health report for 2017 ([12]) presents and evaluates key figures concerning the distribution of sick leave among members insured by the health insurance funds (BKK) ([13]). Some interesting MSD-related results can be summarised as follows (see Table 4):

- In general, the number of sick days taken increased significantly between 2015 and 2016, namely from 15.4 to 17.4 per individual. MSDs are still the most frequently reported reason, accounting for 25.2 % of all days lost. Looking at the period between 2006 and 2016, and especially the period between 2015 and 2016, the increase in sick leave taken due to MSDs becomes obvious. Here, back pain is the main reason among MSDs, accounting for 1,242 sick leave days per 1,000 members. In addition, MSDs account for the largest proportion of sick days among the main groups of diagnoses, accounting for 29.8 %.
- In addition, looking at sick leave due to MSDs in 2016, on average, the number of absences per 100 members is 22.1, whereas the total number of days per 100 members is 440 days. This results in 19.91 days per absence.
- Comparing men and women, it becomes clear that men accumulate significantly more sick leave days due to MSDs. On average, among men there were 24.4 cases of sick leave due to MSDs per 100 members (resulting in 464.3 days per 100 members), whereas among women there were 19.3 cases per 100 members (and 409.6 days).

Table 4: Numbers of sick leave cases and days taken due to MSDs in Germany, by gender and type of MSD, 2016

Type of MSD	Cases per 1,000 members		Days per 1,000 members		Days per case	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
Back pain (M54)	97.91	72.60	1371.1	1080.8	14.0	14.9
Other joint diseases, not classified elsewhere (M25)	13.84	9.02	241.3	177.0	17.4	19.6
Shoulder lesion (M75)	12.20	9.61	388.7	323.7	31.8	33.7
Other enthesopathies (M77)	11.55	8.61	197.9	169.5	17.1	19.7
Other intervertebral disc damage (M51)	11.34	8.37	374.8	307.6	33.1	36.8
Internal damage to the knee joint (M23)	10.54	6.29	321.5	212.4	30.5	33.7
Gonarthrosis (M17)	5.72	4.02	217.1	181.0	37.9	45.0

Source: Kneips F, Pfaff H, Digital work — Digital health BKK health report 2017 (Digitale Arbeit — Digitales Gesundheit BKK Gesundheitsreport 2017, BKK Dachverband). Available at: https://www.bkk-dachverband.de/fileadmin/publikationen/gesundheitsreport_2017/BKK_Report_2017_gesamt_final.pdf

([12]) Kneips F, Pfaff H, Digital work — Digital health BKK health report 2017 (Digitale Arbeit — Digitales Gesundheit BKK Gesundheitsreport 2017, BKK Dachverband). Available at: https://www.bkk-dachverband.de/fileadmin/publikationen/gesundheitsreport_2017/BKK_Report_2017_gesamt_final.pdf

([13]) BKK is the organisation representing 76 health insurance funds in Germany.

Table 5: Number of sick leave cases and days taken due to MSD in Germany, by gender and age (excluding pensioners), 2016

Age group		Cases per 100 members	Days per 100 members	Days per case
< 20 years	Men	12.8	89.40	6.98
	Women	12.1	87.4	7.22
	Average	**12.5**	**88.60**	**7.09**
20-24 years	Men	15.7	157.6	10.04
	Women	13.0	138.3	10.64
	Average	**14.5**	**149.1**	**10.28**
25-29 years	Men	14.9	184.2	12.36
	Women	11.3	148.3	13.12
	Average	**13.3**	**167.5**	**12.59**
30-34 years	Men	15.80	214.1	13.55
	Women	11.2	170.9	15.26
	Average	**13.7**	**194.3**	**14.18**
35-39 years	Men	18.9	291.9	15.44
	Women	13.6	226.2	16.63
	Average	**16.4**	**261.0**	**15.91**
40-44 years	Men	23.1	392.4	16.99
	Women	17.5	330.8	18.90
	Average	**20.5**	**364.0**	**17.76**
45-49 years	Men	26.4	489.6	18.55
	Women	22.0	459.0	20.86
	Average	**24.4**	**475.9**	**19.50**
50-54 years	Men	31.1	640.4	20.59
	Women	26.8	627.3	23.41
	Average	**29.2**	**634.7**	**21.74**
55-59 years	Men	37.8	856.0	22.65
	Women	30.4	787.2	25.89
	Average	**34.7**	**827.0**	**23.83**
60-64 years	Men	35.6	993.5	27.91
	Women	30.4	939.5	30.90
	Average	**33.5**	**971.5**	**29.00**
65+ years	Men	5.6	174.3	31.13
	Women	5.4	180.6	33.44
	Average	**5.5**	**176.6**	**32.11**
Average	Men	24.4	464.3	19.03
	Women	19.3	409.6	21.22
	Average	**22.1**	**440.0**	**19.91**

Source: Kneips F, Pfaff H, Digital work — Digital health BKK health report 2017 (Digitale Arbeit — Digitales Gesundheit BKK Gesundheitsreport 2017, BKK Dachverband). Available at: https://www.bkk-dachverband.de/fileadmin/publikationen/gesundheitsreport_2017/BKK_Report_2017_gesamt_final.pdf

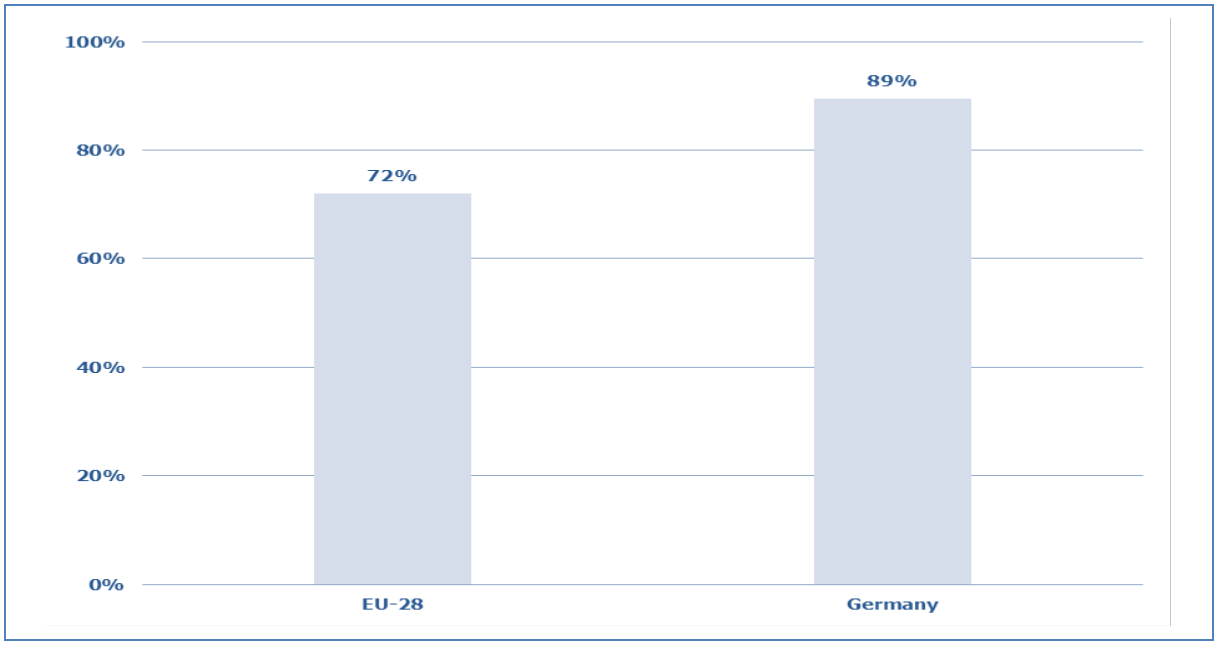
Other relevant findings are:

- Back pain is the main MSD-related problem. This type of MSD is more frequent among men than among women, in that there are 97.91 cases of back pain among men per 1,000 members, versus 72.60 cases among women. However, the number of days per case is slightly higher among women (14.9 days among women in comparison with 14.0 among men).
- The number of sick leave absences due to MSDs increases with age, and the peak is reached in 55- to 59-year-olds (34.7 cases per 100 members). Sick leave days due to MSDs also increase with age, and the peak is reached among 60- to 64-year-olds (32.11 days per case). These results apply to both men and women (see Table 5).

3.2 Employment and work outcomes

A very large proportion of German employees (89 %) work in companies that support employees to return to work after long-term sickness. This percentage is much lower in the EU-28 (72 %) (data from ESENER 2 ([14]) for 2014; see Figure 8).

Figure 8: Percentages of employees working in establishments with support measures for employees returning to work after long-term sickness in the EU-28 and Germany, 2014



Note: Data are weighted with the employee-proportional weighting factor. This weighting factor controls for the disproportional nature of the national samples, is scaled to the number of employees instead of the number of establishments in the universe, and allows for international analysis. ESENER covers employees in enterprises employing five or more workers.

Source: Panteia, based on ESENER 2 data

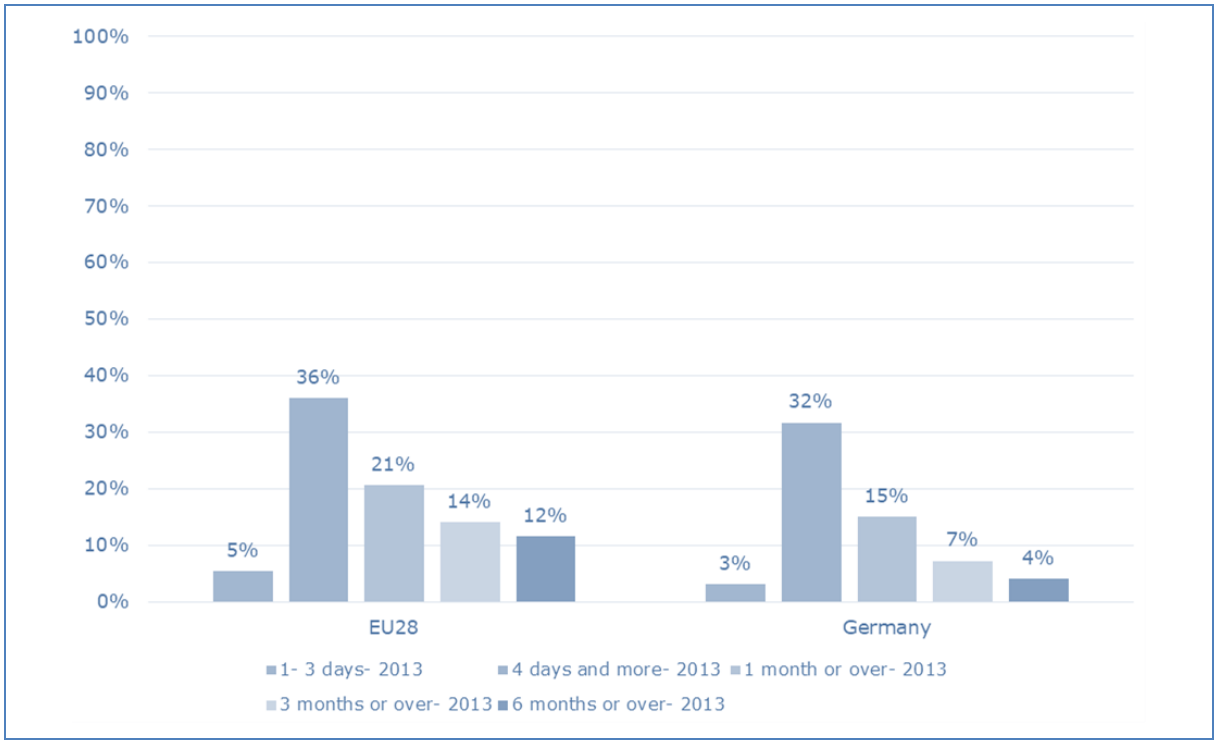
Figure 9 is based on publicly available data from the Labour Force Survey (LFS) ([15]) ad hoc modules. It shows the percentages of people who reported a work-related health problem resulting in sick leave

([14]) EU-OSHA, Second European Survey of Enterprises on New and Emerging Risks (ESENER 2). Information about the survey is available at: https://osha.europa.eu/en/facts-and-figures/esener

([15]) Eurostat, European Union LFS ad hoc module on accidents at work and other work-related health problems. Information about the survey is available at: https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey

characterised by various periods off work in the EU-28 and Germany in 2013. The available data show that up to 32 % of German workers in this situation had a period of 4 days or more off work, in comparison with 36 % in the EU-28. Moreover, 4 % of German workers reporting a work-related health problem resulting in sick leave had a period off work of 6 months or over, compared with 12 % on average in the EU-28.

Figure 9: Percentages of people reporting a work-related health problem resulting in sick leave by period off work, in the EU-28 and Germany, 2013

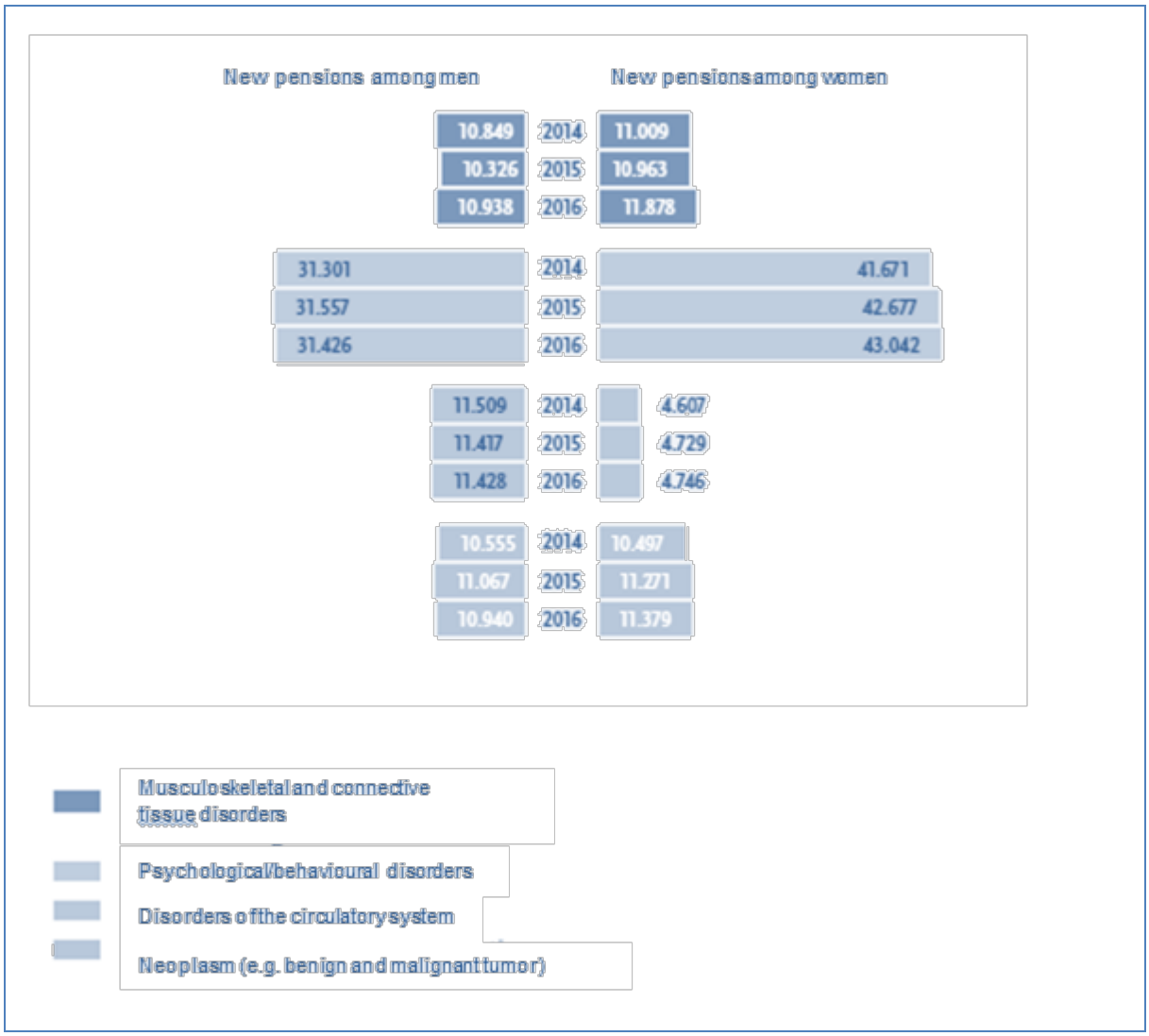


Source: Panteia, based on LFS ad hoc module (Eurostat)

Available national data ([16]) show that musculoskeletal and connective tissue disorders are the second most important underlying reason for new health-related retirement pensions because of reduced working capacity in Germany, after psychological/behavioural disorders (10,938 new pensions among men and 11,878 among women), and the incidence increased between 2014 and 2016 (see Figure 10).

([16]) Federal Institute for Employment Protection and Occupational Medicine (BAuA), *The changing world of work: Figures — data — facts, 2018* (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Arbeitswelt im Wandel, Zahlen — Daten — Fakten), 2018*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Praxis/A99.pdf?__blob=publicationFile&v=11

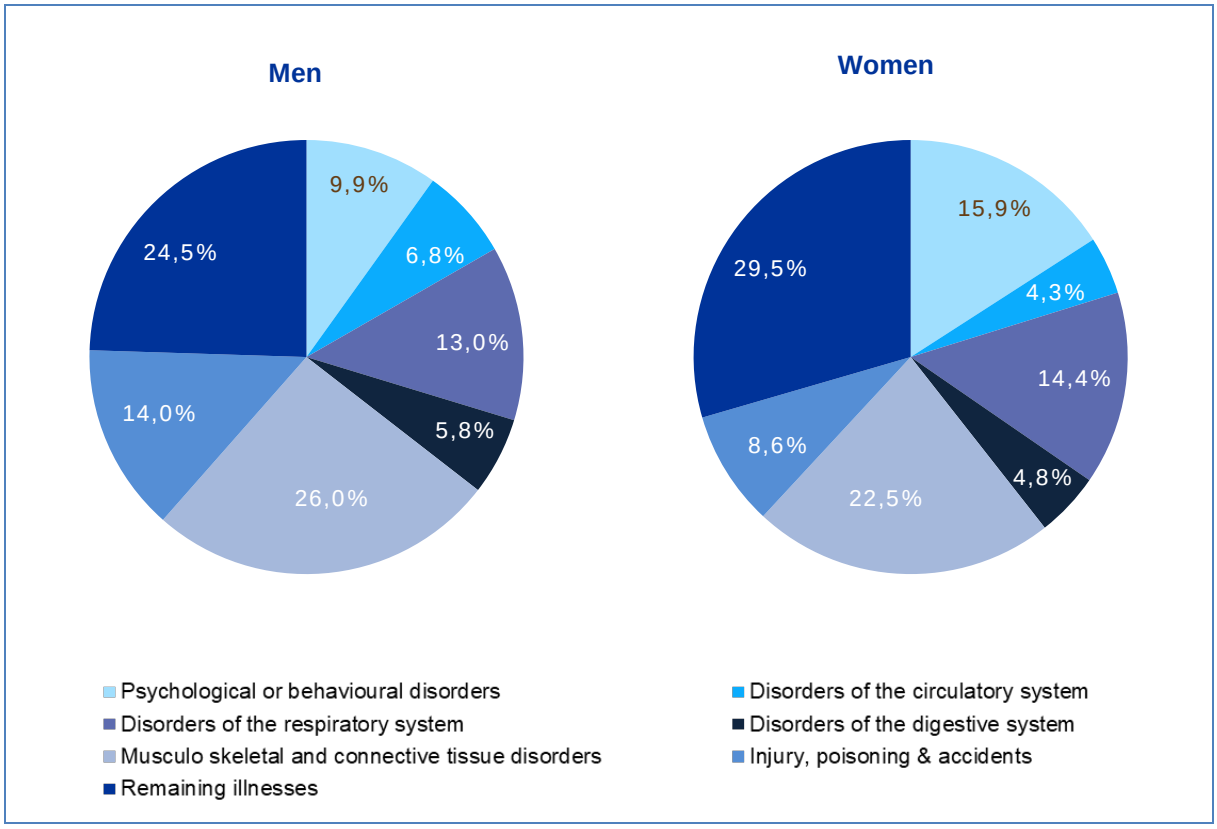
Figure 10: Number of new health-related retirement pensions due to reduced working capacity in Germany, by gender, 2014-2016



Source: Federal Institute for Employment Protection and Occupational Medicine (BAuA), *The changing world of work: Figures — data — facts, 2018* (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Arbeitswelt im Wandel, Zahlen — Daten — Fakten), 2018*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Praxis/A99.pdf?__blob=publicationFile&v=11

Moreover, BAuA also offers interesting information on the number of days of sick leave, comparing the causes of sick leave between men and women. Thus, musculoskeletal and connective tissue disorders are the main reason behind the number of sick leave days taken among men (26.0 % of the total) and the second most important reason among women (22.5 % of the total) (data for 2016; see Figure 11).

Figure 11: Number of days of sick leave taken in Germany, by group of health problems and gender, 2016



Source: Federal Institute for Employment Protection and Occupational Medicine (BAuA), *The changing world of work: Figures — data — facts, 2018* (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Arbeitswelt im Wandel, Zahlen — Daten — Fakten), 2018*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Praxis/A99.pdf?__blob=publicationFile&v=11

BAuA also provides data on MSD-related sick leave days. The average number of MSD-related sick leave days (per full-time equivalent membership year of statutory health insurance) is 5.5 days. By economic sector, on average, the sectors with the highest number of MSD-related sick leave days are the food and beverage industry, metal manufacturing, and transport and storage (with 7.2 days each), followed by wood, paper and printing, with 7.1 days.

By gender, the average number of MSD-related sick leave days for men is 5.7, and for women it is 5.2 days. Women have the highest number of MSD-related sick leave days in transport and storage (7.6 days), whereas the highest number for men is in public administration, defence and social insurance (7.6 days). In addition, significant differences emerge when the data are broken down by age, as the number of MSD-related sick leave days is higher among workers who are 45 years or older (8.4 days) than among workers under 45 years of age (3.0 days). By sector, the highest MSD-related sick leave days of workers under 45 years of age is 4.4 days in the transport sector, whereas the highest number among workers of 45 years or older is 10.8 days in the food and beverage industry (see Table 6).

Table 6: MSD-related sick leave days (days per full-time equivalent membership year of statutory health insurance) in Germany, by economic sector, 2016

Economic sector	Gender			Under 45 years			45 years or older		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Agriculture, forestry and fisheries	5.2	4.8	6.0	2.6	2.4	3.0	8.1	7.7	8.9
Food and beverage industry	7.2	7.2	7.3	3.8	4.0	3.6	10.8	10.7	10.8
Wood, paper and printing	7.1	7.3	6.6	3.7	4.0	2.8	10.0	10.1	9.7
Chemistry	6.7	6.8	6.4	3.4	3.7	2.6	9.6	9.5	9.9
Metal manufacturing	7.2	7.3	6.7	3.9	4.0	2.8	10.5	10.6	9.7
Manufacture of electronic, optical and data processing machines	4.2	3.4	5.7	2.1	2.0	2.3	6.5	5.2	8.5
Manufacture of electrical equipment	6.0	5.5	7.3	2.8	2.9	2.8	8.9	8.1	10.5
Machinery	5.4	5.7	4.3	2.8	3.0	1.9	8.3	8.5	7.0
Automotive	6.2	6.2	6.1	3.2	3.4	2.7	9.0	8.8	10.3
Other manufacturing	6.6	6.8	6.0	3.3	3.7	2.5	9.5	9.8	8.9
Energy supply, water supply and waste disposal	6.9	7.5	4.2	3.3	3.8	1.9	9.4	9.9	6.7
Construction sector	6.8	7.3	3.1	4.1	4.4	2.0	10.4	11.3	4.4
Retail, maintenance and repair of motor vehicles	5.0	5.1	4.9	3.0	3.2	2.9	7.9	8.0	7.8
Transport and storage	7.2	7.0	7.6	4.4	4.6	3.9	9.6	9.1	10.9
Hospitality sector	4.2	3.1	5.1	2.5	2.1	2.9	7.0	5.2	8.1
Information and communication	2.0	2.2	2.9	1.3	1.2	1.5	4.4	3.9	5.2
Finance and insurance services	2.5	2.1	2.7	1.3	1.2	1.4	4.1	3.3	4.6
Real estate and housing	4.4	4.9	3.8	2.3	2.8	2.0	6.1	6.6	5.6
Freelance, scientific and technical services	2.4	2.6	2.3	1.4	1.5	1.3	4.3	4.4	4.1
Other market services	5.9	5.6	6.4	3.8	3.9	3.7	8.7	8.2	9.2
Public administration, defence and social insurance	6.1	7.6	5.1	2.4	3.0	2.1	8.7	10.2	7.6
Education and teaching	3.4	2.7	3.6	2.8	2.6	2.9	5.7	4.7	6.0
Health and social services	5.6	4.6	5.8	2.8	2.6	2.9	9.1	7.2	9.5
Other services	4.2	4.2	4.2	2.4	2.5	2.4	6.3	6.1	6.4
Other sectors	5.1	5.6	4.6	2.8	3.0	2.7	7.5	8.4	6.5
Total average	**5.5**	**5.7**	**5.2**	**3.0**	**3.3**	**2.6**	**8.4**	**8.6**	**8.2**

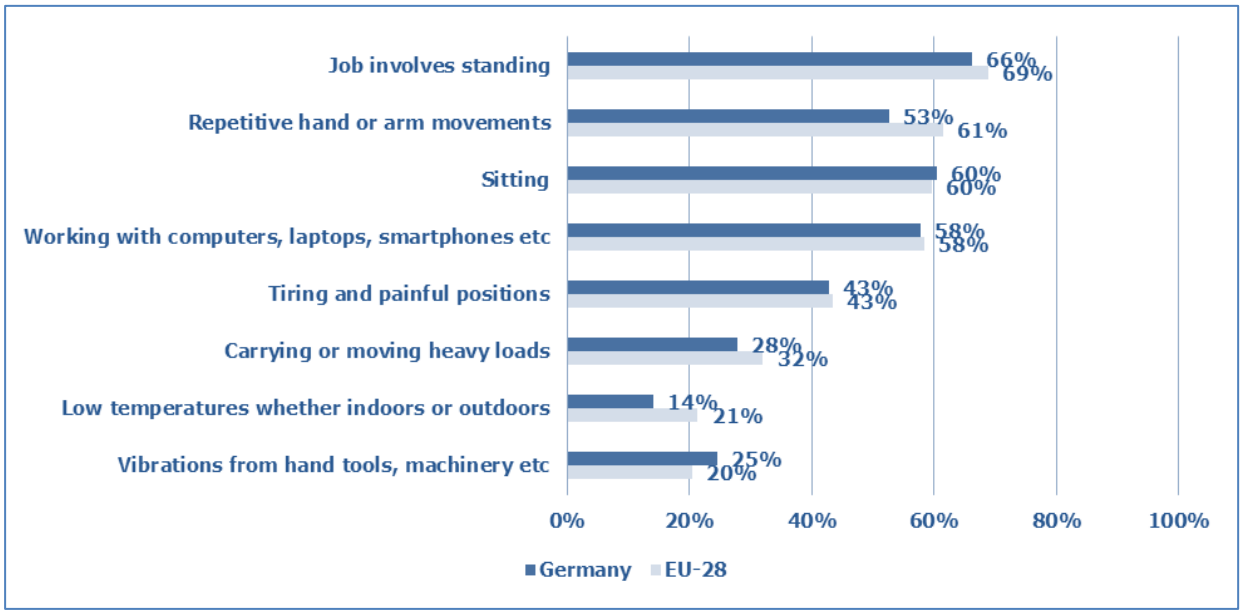
Source: Federal Institute for Occupational Safety and Health (BAuA), Safety and health at work - Report 2016, Work- accident prevention report. Available at: https://www.baua.de/EN/Service/Publications/Report/Suga-2016.html

4 Risk factors for MSDs

4.1 Physical factors at work

A large percentage of German employees are exposed to physical factors at work that may put them at risk of MSDs (see Figure 12). More precisely, 66 % of them work in establishments where they are exposed to working in standing positions, 60 % work in sitting positions and 58 % work with computers/laptops. Other physical risks such as repetitive hand/arm movements and working in tiring/painful positions affect 53 % and 43 % of employees, respectively, whereas other risks such as carrying/moving heavy loads, low temperatures and vibrations are less prevalent.

Figure 12: Percentages of employees working in establishments where there are certain physical risk factors in Germany and the EU-28, 2015 (2010 for standing)



Note: Data are weighted with the employee-proportional weighting factor. This weighting factor controls for the disproportional nature of the national samples, is scaled to the number of employees instead of the number of establishments in the universe, and allows for international analysis. ESENER covers employees in enterprises employing five or more workers.

Source: Panteia, based on ESENER 2 data

A comparison with EU-level data shows that the relative importance of the different physical risk factors is similar in Germany to in the EU-28, with the exception of the risk linked to repetitive hand/arm movement (which is less relevant in the Germany). In addition, the available data show that German employees are, generally speaking, less exposed than their EU counterparts to most of the identified risks, with the exception of exposure to vibrations.

In addition, an interesting national study ([17]) has calculated the relative risk of the occupational burdens for several exposure factors (using a case-control methodology). According to the available data, having little space for working is the risk with the highest probability of resulting in an MSD-related inability to work. More precisely, employees with little space for working are 5.67 times more likely to have an MSD-related inability to work than workers with enough space for working. The second most important risk is

([17]) Bödeker W, Friedel H, Friedrichs M, Röttger C, *Kosten der Frühberentung. Abschätzung des Anteils der Arbeitswelt*, Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund, 2006.

an “effort-reward imbalance” situation ([18]) (5.15 times), followed by physical stress (4.12 times) and heavy work (3.55 times) (see Table 7).

Table 7: Main risk factors associated with MSD-related inability to work in Germany, 2006

Main risks (exposure factors)	Relative risk of having an MSD-related inability to work	
	Men	Women
Physical stress	4.12	1.91
Heavy work	3.55	1.88
Dirty conditions	1.46	1.23
Hazardous substances	0.72	1.20
Heat, cold	3.08	1.32
Noise	2.46	0.97
Smoke, dust	2.35	1.38
Shift and night work	1.34	1.87
Vibrations	1.13	-
Constrained posture	2.47	1.72
Effort-reward imbalance model	5.15	1.33
Little space for working	5.67	2.22
Mental demands	1.10	0.53
Qualification requirements	0.99	1.24
Concentration requirements	1.96	0.87

Source: Bödeker et al,, *Kosten der Frühberentung. Abschätzung des Anteils der Arbeitswelt*, Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund, 2006

Moreover, according to the BIBB/BAuA Employee Survey 2012, 54.4 % of German employees report working frequently in an upright position, 48.4 % report that their work involves repetitive tasks and 41.8 % regularly use their hands in work demanding high rapid movements or considerable strength.

It is also possible to look at the some specific working conditions that particularly bother employees (see Table 8). Thus, 53.8 % of employees lifting and carrying heavy loads report being bothered by this (22.3 % of employees do this type of work on a frequent basis), whereas 53.6 % of employees exposed to vibrations and noise report being bothered by these conditions (4.3 % of the employees do this type of work on a frequent basis). In addition, 49.0 % of those frequently working in a constrained posture are bothered by this (16.6 % of employees do this type of work on a frequent basis). In addition, 28.3 % of those working regularly in an upright position are bothered it (54.4 % of employees do this type of work on a frequent basis).

([18]) Effort-reward imbalance refers to a failed reciprocity between a high degree of effort made at work and low rewards received in return (salary, promotion prospects, job security, esteem, recognition), resulting in negative emotions and stress reactions.

Table 8: Percentage of employees reporting working frequently under certain working conditions and percentage (*) bothered by those conditions in Germany, 2012

Category	Employees reporting working frequently under the stated condition	Employees bothered by stated condition
Working in an upright position	54.4	28.3
Lifting and carrying heavy loads	22.3	53.8
Working with hands, demanding rapid movements and considerable strength	41.8	18.5
Constrained posture	16.6	49.0
Vibrations, waves	4.3	53.6
Execution of working tasks is stipulated in every detail	24.8	34.4
Repetitive tasks	48.4	17.7
Minimum performance level demand, time stipulated	29.7	46.7

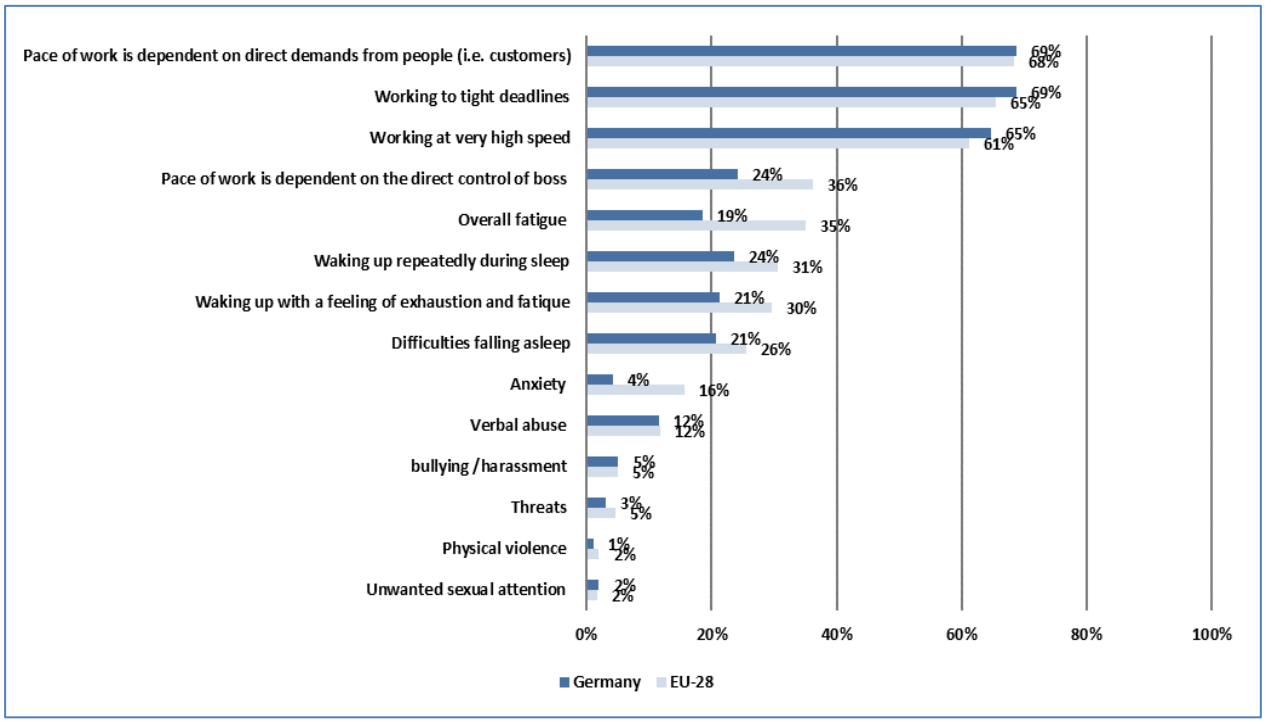
(*) Only employees working frequently under the stated condition

Source: Federal Institute for Employment Protection and Occupational Medicine (BAuA) & Federal Institute for Vocational Training (BIBB), Basic evaluation of the BIBB/BAuA employee survey 2012 focusing on working conditions, work-related strains and physical discomfort, 2012 (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) & Bundesinstitut für Berufsbildung (BIBB), *Grundauswertung der BIBB/BAuA-Erwerbstätigenbefragung 2012)*. Available at: https://www.baua.de/EN/Topics/The-changing-world-of-work-and-occupational-safety-and-health/Monitoring-working-conditions/Working-conditions/BIBB-BAuA-2012.html

4.2 Organisational and psychosocial risk factors

Organisational and psychosocial risk factors also play a role as potential triggers of MSDs (see Figure 13). The most relevant of these factors among German employees relate to the pace of work being dependent on other people's demands, tight deadlines and working at very high speed (more than 65 % of employees work in establishments where these risks are present). Other relatively important risks include the pace of work being dependent on the manager or, generally speaking, difficulties with sleep.

Figure 13: Percentages of employees working in establishments where the following organisational/psychosocial risk factors are present in Germany and the EU-28, 2015



Note: Data are weighted with the employee-proportional weighting factor. This weighting factor controls for the disproportional nature of the national samples, is scaled to the number of employees instead of the number of establishments in the universe, and allows for international analysis. ESENER covers employees in enterprises employing five or more workers.

Source: Panteia, based on ESENER 2 data

A comparison with EU-level data shows that the most relevant organisational and psychosocial risk factors are very similar in Germany and in the EU-28. The available data show that German employees are less exposed than their EU counterparts to many of the risks identified, particularly in relation to overall fatigue, the pace of work being under the direct control of the manager, difficulties with sleep and anxiety.

4.3 Sociodemographic risk factors

BAuA provides national data on working conditions and the presence of MSDs among temporary agency workers versus not temporary agency workers. Temporary agency work describes the transfer of employees to third parties for the purpose of performing work and is regulated in the Temporary Employment Act (AÜG). As a result of the steady increase in this type of employment (on average 342,508 employees in 2001 compared with an average of 990,792 workers in 2016), there is a significant need to develop safe, secure and healthy working conditions for temporary agency workers.

As the available data show, compared with the non-temporary agency workers, temporary agency workers work much more often under physically demanding working conditions or difficult environmental conditions. For instance, 71.7 % of temporary workers work in an upright position versus 55.4 % of non-temporary agency workers. And 48.6 % of temporary agency workers must wear (personal) protective clothing versus 28.2 % of non-temporary agency workers (see Table 9).

Table 9: Percentage of temporary and permanent agency workers affected by demanding working conditions in Germany, 2012

Working condition	Temporary agency workers	Non-temporary agency workers
Working in an upright position	71.7	55.4
Working in a constrained posture	27.7	17.5
Lifting and carrying heavy loads: men > 20 kg; women > 10 kg)	35.3	23.6
Working under noisy conditions	40.7	25.6
Low and high temperature, humidity, air currents	31.1	20.7
Oil, grease, dirt, filth	25.0	17.7
Wearing (personal) protective clothing	48.6	28.2

Source: Federal Institute for Employment Protection and Occupational Medicine (BAuA), *The changing world of work: Figures — data — facts, 2018* (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Arbeitswelt im Wandel, Zahlen — Daten — Fakten), 2018*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Praxis/A99.pdf?__blob=publicationFile&v=11

The predominantly physical activities of temporary agency workers are reflected in their health complaints. In particular, pain in the knees, neck pain/shoulder pain or lower back pain occur more frequently among temporary workers than among non-temporary workers. By contrast, temporary agency workers are less affected by nervousness and irritability than non-temporary agency workers (see Table 10).

Table 10: Percentage of temporary and non-temporary agency workers with health complaints during or immediately after work in Germany, 2012

Main health problem	Temporary agency workers	Non-temporary agency workers
Lower back pain	53.4	48.4
Neck pain/shoulder pain	52.7	49.9
Knee pain	32.8	22.8
Headache	38.5	34.9
Nightly sleep disturbances	24.3	27.1
Overall tiredness/exhaustion	52.3	46.3
Nervousness/irritability	24.5	28.2

Source: Federal Institute for Employment Protection and Occupational Medicine (BAuA), *The changing world of work: Figures — data — facts, 2018* (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Arbeitswelt im Wandel, Zahlen — Daten — Fakten), 2018*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Praxis/A99.pdf?__blob=publicationFile&v=11

In addition, the BKK health report 2017 ([19]) presents and evaluates key figures concerning the distribution of sick leave among members insured by the health insurance funds (BKK) according to some sociodemographic characteristics of workers. The most relevant results can be summarised as follows (see Table 11):

([19]) Kneips F, Pfaff H, Digital work — Digital health BKK health report 2017 (Digitale Arbeit — Digitales Gesundheit BKK Gesundheitsreport 2017, BKK Dachverband). Available at: https://www.bkk-dachverband.de/fileadmin/publikationen/gesundheitsreport_2017/BKK_Report_2017_gesamt_final.pdf

- Available data show that the higher an employee's educational or occupational level, the fewer of sick leave days taken. In particular, days of absence due to MSDs among employees with low levels of school or vocational qualifications are significantly higher than among those with higher degrees. In addition, sick leave days due to MSDs are more prevalent in very physically demanding occupations (e.g. in manufacturing and construction).
- Higher job requirements are associated with lower absenteeism. This correlation is particularly evident in the number of sick days due to MSDs, which differ more than four-fold between the highest and lowest skill levels. Employees in supervisory or managerial positions have less absenteeism due to illness than other skilled employees, which is particularly evident for sick leave days due to MSDs.
- Looking at the workers' employment situation, sick leave cases per 100 members are higher among employed members than among unemployed members (23.53 and 18.57, respectively). However, the number of days per case is noticeably higher among the unemployed (47.6 days per case for the unemployed and 19.4 days per case for the employed).
- For members employed part-time, sick leave cases per 100 members are lower than the average for all the employed (21.20 cases among the part-time employed compared with 23.53 cases among the employed), but the number of days per case is slightly higher (21.9 days among the part-time employed compared with 19.4 days among the average of all employed members).

Table 11: Sick leave cases due to MSDs in Germany, by employment status, 2016

Employment status		Sick leave - cases per 100 members	Sick leave days per 100 members	Days per case
All Employed members	Men	25.99	482.7	18.6
	Women	20.46	422.6	20.7
	Average	**23.53**	**456.0**	**19.4**
Unemployed members	Men	18.76	919.2	49.0
	Women	18.37	844.3	46.0
	Average	**18.57**	**883.6**	**47.6**
Part-time employed members	Men	20.35	398.4	19.6
	Women	21.36	476.2	22.3
	Average	**21.20**	**464.0**	**21.9**

Source: Kneips F, Pfaff H, Digital work — Digital health BKK health report 2017 (Digitale Arbeit — Digitales Gesundheit BKK Gesundheitsreport 2017, BKK Dachverband). Available at:https://www.bkk-dachverband.de/fileadmin/publikationen/gesundheitsreport_2017/BKK_Report_2017_gesamt_final.pdf

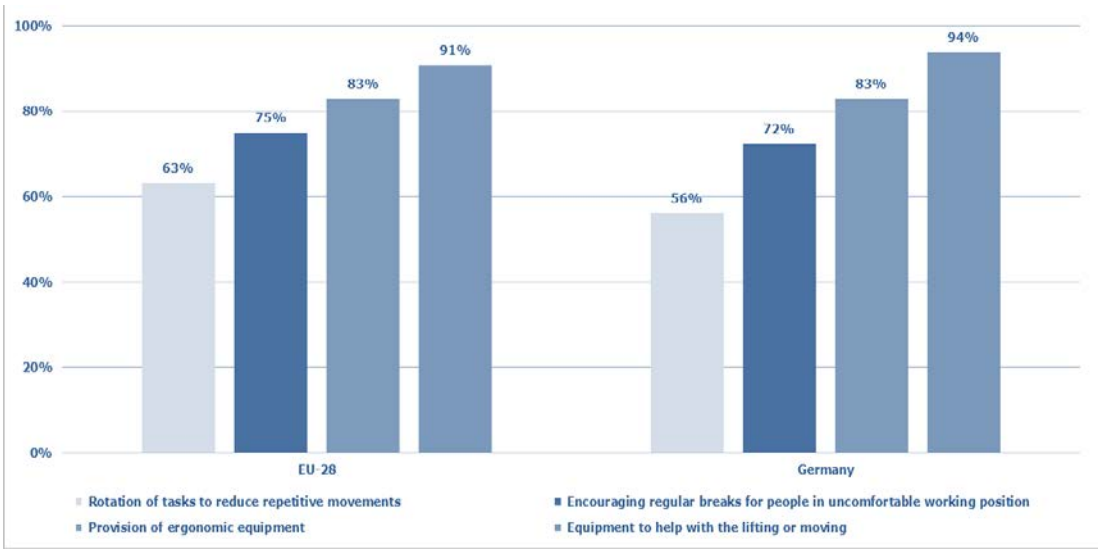
Finally, concerning the future development of MSDs in Germany and possible trends in sick leave due to MSDs ([20]), there are two opposing forces. On the one hand, the ageing working population, together with the higher percentage of people working predominantly in sitting positions, is likely to lead to an increase in the incidence of MSDs and associated inability-to-work days. On the other hand, other factors, such as the economic situation, the active involvement of employers and workers in MSD prevention activities or changes in doctors' diagnostic behaviour may have a positive impact in terms of reducing the presence and importance of MSDs. Therefore, it is difficult to predict future developments in sick leave due to MSDs.

([20]) Summary of information obtained during a telephone conversation with Mr Dirk Rennert, German expert participating in the the BKK health report 2017.

5 Prevention of MSDs

A high proportion of German companies report implementing measures to prevent MSDs within their establishments: 94 % of employees work in companies where equipment to help with lifting or moving is provided, and 83 % work in companies where ergonomic equipment is provided. Moreover, 72 % of German employees work in companies that encourage regular breaks for people working in uncomfortable positions and 56 % work in companies where rotation of tasks has been introduced to reduce repetitive movements (data for 2014; see Figure 14). These percentages are in line with the EU-28 averages, although the percentage for rotation of tasks is noticeably higher at EU-28 level (63 %).

Figure 14: Percentages of employees working in establishments where there are certain preventive measures in place, EU-28 and Germany, 2014

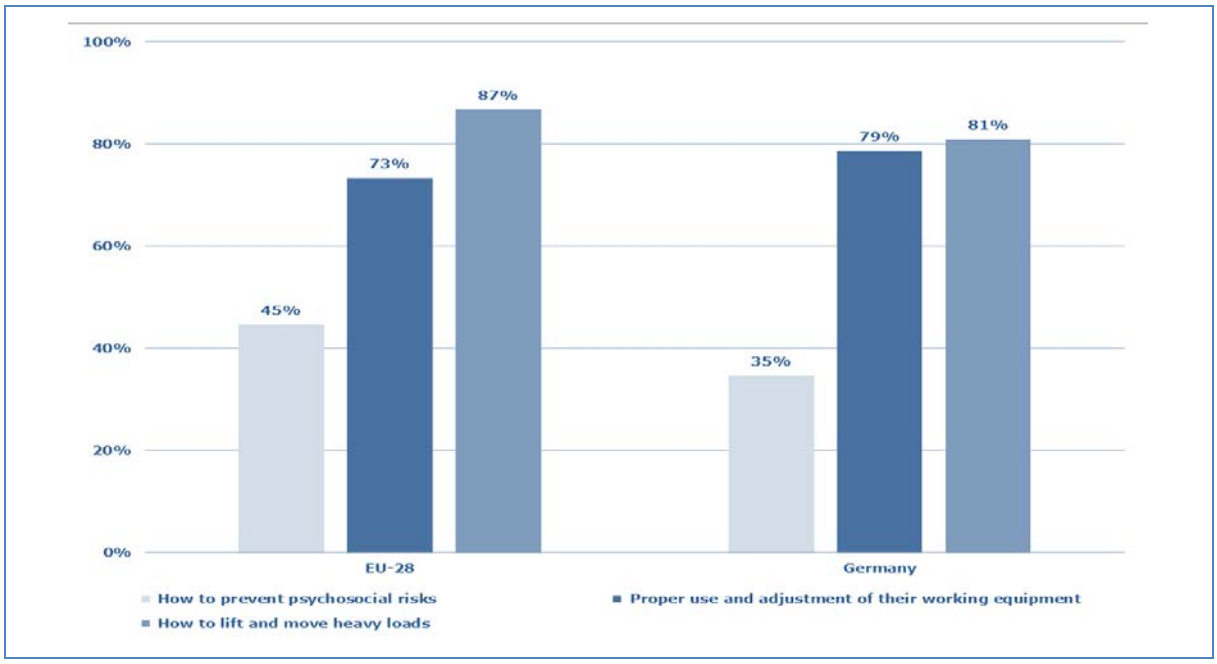


Note: Data are weighted with the employee-proportional weighting factor. This weighting factor controls for the disproportional nature of the national samples, is scaled to the number of employees instead of the number of establishments in the universe, and allows for international analysis. ESENER covers employees in enterprises employing five or more workers.

Source: Panteia, based on ESENER 2 data

As shown in Figure 15, 81 % of German employees work in companies where training on how to lift and move heavy loads is provided, 79 % work in companies where training on the proper use and adjustment of work equipment is provided and 35 % work in companies where training on how to prevent psychosocial risks is provided (data for 2014). These percentages are quite similar to the EU-28 averages, although training on how to prevent psychosocial risks is higher in the EU-28 (45 %).

Figure 15: Percentages of employees working in establishments where training is provided in the EU-28 and Germany, 2014



Note: Data are weighted with the employee-proportional weighting factor. This weighting factor controls for the disproportional nature of the national samples, is scaled to the number of employees instead of the number of establishments in the universe, and allows for international analysis. ESENER covers employees in enterprises employing five or more workers.

Source: Panteia, based on ESENER 2 data

6 Main national data sources on MSDs

- Data source 1: Federal Institute for Employment Protection and Occupational Medicine (BAuA), *The changing world of work: Figures — data — facts, 2018* (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Arbeitswelt im Wandel, Zahlen — Daten — Fakten), 2018*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Praxis/A99.pdf?__blob=publicationFile&v=11
- Data source 2: Federal Institute for Employment Protection and Occupational Medicine (BAuA) & Federal Institute for Vocational Training (BIBB), Basic evaluation of the BIBB/BAuA employee survey 2012 focusing on working conditions, work-related strains and physical discomfort, 2012 (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) & Bundesinstitut für Berufsbildung (BIBB), *Grundauswertung der BIBB/BAuA-Erwerbstätigenbefragung 2012)*. Available at: https://www.baua.de/DE/Angebote/Publikationen/Berichte/Gd73.pdf?__blob=publicationFile; Information in English at:https://www.baua.de/EN/Topics/The-changing-world-of-work-and-occupational-safety-and-health/Monitoring-working-conditions/Working-conditions/BIBB-BAuA-2012.html
- Data source 3: Kneips F, Pfaff H, *Digital work — Digital health BKK health report 2017* (*Digitale Arbeit — Digitales Gesundheit BKK Gesundheitsreport 2017,* BKK Dachverband). Available at: https://www.bkk-dachverband.de/fileadmin/publikationen/gesundheitsreport_2017/BKK_Report_2017_gesamt_final.pdf
- Data source 4: Federal Institute for Occupational Safety and Health (BAuA), Safety and health at work - Report 2016, Work- accident prevention report (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA), *Sicherheit und Gesundheit bei der Arbeit: Berichtsjahr 2016, Unfallverhütungsbericht Arbeit*). Available at: https://www.baua.de/DE/Angebote/Publikationen/Berichte/pdf/Suga-2016-barrierefrei.pdf?__blob=publicationFile&v=2. Information in English at: https://www.baua.de/EN/Service/Publications/Report/Suga-2016.html
- Data source 5: Federal Institute for Occupational Safety and Health (BAuA), *Occupational risk for the occurrence of sick leave due to musculoskeletal disorders and diseases of the cardiovascular system — Identification of occupations with high relevance for prevention*, 2016 (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, *Berufsspezifisches Risiko für das Auftreten von Arbeitsunfähigkeit durch Muskel-Skelett-Erkrankungen und Krankheiten des Herz-Kreislauf-Systems — Bestimmung von Berufen mit hoher Relevanz für die Prävention*), 2016. Available at: https://www.baua.de/DE/Angebote/Publikationen/Berichte/F2255.pdf?__blob=publicationFile&v=2
- Data source 6: Information on work accidents from the German statutory accident insurance organisation, Deutsche Gesetzliche Unfallversicherung. Annual data by gender, age, sector and occupational group available at: https://www.dguv.de/de/zahlen-fakten/vorlaeufige_zahlen/allgemeine-uv/index.jsp

The European Agency for Safety and Health at Work (EU-OSHA) contributes to making Europe a safer, healthier and more productive place to work. The Agency researches, develops, and distributes reliable, balanced, and impartial safety and health information and organises pan-European awareness raising campaigns. Set up by the European Union in 1994 and based in Bilbao, Spain, the Agency brings together representatives from the European Commission, Member State governments, employers' and workers' organisations, as well as leading experts in each of the EU Member States and beyond.

European Agency for Safety and Health at Work

Santiago de Compostela 12, 5th floor
48003 Bilbao, Spain
Tel. +34 944358400
Fax +34 944358401
E-mail: information@osha.europa.eu

http://osha.europa.eu

Publications Office