PREVENTION OF MUSCULOSKELETAL DISORDERS AND PSYCHOSOCIAL RISKS IN THE WORKPLACE: EU STRATEGIES AND FUTURE CHALLENGES

Introduction

This discussion paper was developed as part of the collaboration agreement signed by the Italian National Institute for Insurance against Accidents at Work (INAIL) and the European Agency for Safety and Health at Work (EU-OSHA) related to the provision of research services in the area of musculoskeletal disorder (MSD) prevention.

MSDs represent a significant global health problem affecting around 1.71 billion people globally (GBD 2019 Diseases and Injuries Collaborators, 2020). These disorders affect the locomotor apparatus involving muscles, nerves, tendons, the skeleton, joints, cartilage, spinal discs and the localised vascular system. MSDs are characterised by light, chronic or acute pain and lead to functional limitations ranging from short-lived or transitory disorders to permanent disabling injuries (EU-OSHA, 2002, 2010; Roquelaure, 2018). MSDs are also recognised as a major occupational health issue representing one of the most important causes of chronic disability, sick leave absence, reduced work productivity and quality of life (Briggs et al., 2018; Crawford et al., 2020). A large body of evidence has reported prevalence of MSDs in specific working populations and/or different occupational sectors and demonstrated a direct or moderate causal effect of work in the onset of work-related MSDs (Ahn et al., 2020; da Costa & Vieira, 2010; Russo et al., 2020). MSDs may be grouped in three areas mirroring the main parts of the musculoskeletal apparatus, namely: 1. Back, 2. Lower limbs (hips, legs, knees, feet, etc.), and 3. Upper limbs (Shoulders, neck and/or arms, hands).

In 1985, the World Health Organisation (WHO) defined work-related disorders as multifactorial diseases among a working population that are the result of a number of different factors and which can be caused and/or aggravated, partially and not exclusively, by work and occupational exposures. Based on this definition, the multifactorial aetiology of work-related MSDs has been recognised over time, and the use of multi-casual models has flourished in the field of occupational health prevention. A combination of individual, physical, psychological, social and work-related aspects have been included in the epidemiological studies on determinants of work-related MSDs. Work-related MSDs are a major work-related disorder in most physically demanding jobs since these are triggered generally by biomechanical overstrains and ergonomic discomfort. The most common recognised professional risk factors involve lifting and carrying heavy objects, prolonged awkward posture, repetitive movement, intensive efforts, pulling and pushing heavy loads, twisted or repetitive strain, prolonged exposure to atypical temperature or vibration, and intensive physical exertion or pressure.

Further occupational and non-occupational factors are recognised as playing a role in the onset, course and/or worsening of work-related MSDs (Cole & Rivilis 2004; National Research Council & Institute of Medicine, 2001; Roquelaure, 2018):

- several demographic and individual characteristics (e.g. gender, age, migrant status, ethnicity, genetics, socioeconomic situation);
- health conditions and comorbidities;
- risk factors linked to unhealthy behaviours and lifestyles (such as overweight, physical inactivity, sedentary lifestyle);
- psychosocial risks;
- digitalisation and the use of new technologies in the workplace.

Psychosocial risks have assumed increasing relevance in the study of determinants of MSDs over time (Bongers et al., 1993). These risks are defined as those aspects of the work design, organisation

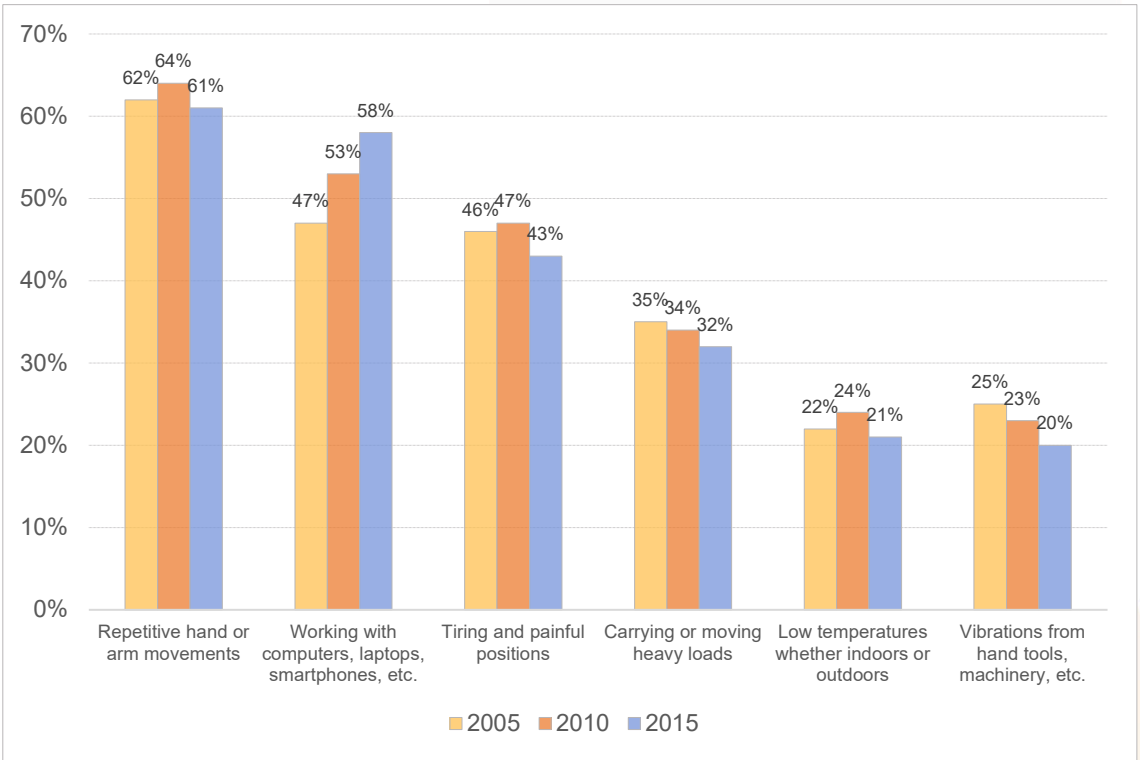
and management, and the relative social context that may have a potential negative impact on psychological, physical and social health and well-being (Cox & Griffiths, 2005; ILO, 1986). There is a strong body of evidence that psychosocial and organisational factors, such as high workload/demands, low social support, low job control, low job satisfaction and monotonous work, raise the risk of MSDs, especially when combined with physical risks. Moreover, the changing world of work highlights new psychosocial risks associated with the work organisation that must be considered in the study of the onset and development of MSDs. The future of work is bringing several challenges and opportunities in occupational health and safety under three major drivers: the rapid progress of technological innovation, demographic changes and changes in the labour market, especially owing to new ways of performing jobs.

Accordingly, the management of MSDs has been going towards a renewed focus on improving musculoskeletal health prevention in the workplace using multifactorial models and integrated protocols, including psychosocial risks management at European and national levels.

Prevalence of MSDs in Europe

MSDs are one of the most common work-related disorders that in Europe affect millions of workers and cause huge social costs, in terms of health and loss of productivity. In particular, around 60% of European workers declaring work-related health problems identify MSDs as the most serious problem (EU-OSHA, 2019) and around three out of five workers in the EU report suffering from MSDs (Eurofound, 2017). The most common types of MSDs are back pain (43%) and muscular pain in the shoulders, neck and upper limbs (41%), while muscular pain in the lower limbs are less often reported (29%) (EU-OSHA, 2019). According to the findings of the fifth European Working Conditions Survey (EWCS) (Eurofound, 2017), the prevalence of MSDs varies between Member States. In particular, the highest percentage of workers reporting that they suffered from one or more MSDs in the past 12 months was in Finland 79%, France 75% and Denmark 73%; in Italy, this percentage was 50%, slightly below the European mean score (58%). The prevalence of self-reported MSDs also shows significant differences between productive sectors. MSDs are most often mentioned by EU workers employed in construction, water supply, and agriculture, forestry and fishing. MSD prevalence is also above average among workers in human health and social work activities. Finally, the sectors where MSDs are reported least often are financial and insurance activities, professional, scientific and technical activities, education, and arts, entertainment and recreation (EU-OSHA, 2019). Prevalence of MSDs also varies with sociodemographic factors like gender, age and education; in particular, the rates of MSDs are slightly higher for female workers (60%) than for male workers (56%). The likelihood of reporting MSDs increases significantly with age: workers over 55 years reported more often (67%) one or more MSDs than workers under 25 years (45%). Finally, workers with only pre-primary or primary education are more likely to report MSDs (EU-OSHA, 2019). Physical and ergonomic risk factors are among the main causes reported for MSDs. Figure 1 shows the trends from 2005 to 2015 in the exposure of European workers to these risk factors, where repetitive hand and arm movements are in first place.

Figure 1: Percentage of workers reporting that they are exposed to different physical risk factors at their work at least a quarter of the time, EU-25 in 2005, EU-28 in 2010 and 2015



Source: EU-OSHA (2019) based on the fourth (2005), fifth (2010) and sixth (2015) waves of the EWCS.

It is interesting to note that in recent years there has been a decrease in the perceived exposure for all physical and ergonomic risk factors with the exception of work done with computers, laptops and smartphones, which has grown significantly from 47% in 2005 to 58% in 2015. Furthermore, as mentioned above, there is more and more evidence in the international scientific literature (EU-OSHA, 2021) that identifies organisational and psychosocial risk factors as determining and concurrent risk factors for the onset of MSDs.

MSDs at national level: the case of Italy

MSDs are a major cause of concern since they affect the general health of many workers, and they have large economic impacts on organisations with great social costs in several European countries. These are the most common recognised occupational diseases in several Member States. In particular, Italian data on occupational diseases (INAIL, 2021a) shows that MSDs are the main work-related diseases affecting the Italian workforce. According to the INAIL's report on accidents and occupational diseases, MSDs in the workplace is a growing phenomenon in Italy. In 2008, MSDs accounted for less than 40% of the total reported occupational diseases, while their incidence was almost 70% in 2020.

Table 1 shows data relating to total reports of occupational diseases in Italy compared with those relating to the musculoskeletal system in the last 5 years. It should be noted that the latter have steadily grown from 64.23% in 2016 to 67.52% in 2020 (INAIL, 2021a). In particular, the trend of complaints relating to the three most common types of MSDs shows that dorsopathies and soft tissue disorders constitute the majority of the diseases reported in the 5 years analysed, and a lesser extent of arthropathies follows.

Table 1: Total reports of occupational diseases in Italy compared with those relating to the musculoskeletal system in the last 5 years

	2016	2017	2018	2019	2020
Diseases of the musculoskeletal system and connective tissue	38,681 (64.23%)	37,608 (64.85%)	39,001 (65.59%)	40,887 (66.81%)	30,355 (67.52%)
Other reported occupational diseases	21,537 (35.77%)	20,387 (35.15%)	20,460 (34.41%)	20,314 (33.19)%	14,600 (32.84%)
Total	60,218	57,995	59,461	61,201	44,955

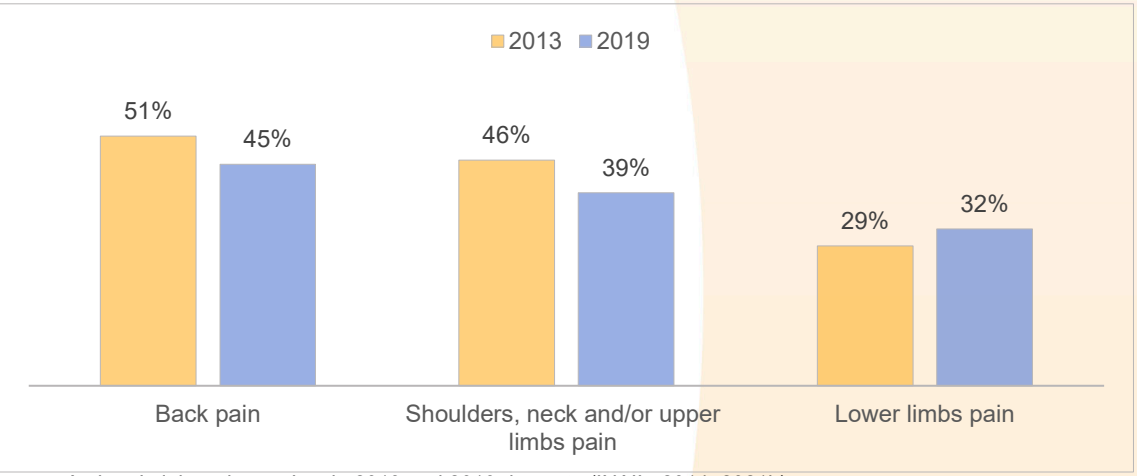
Source: Adapted from INAIL, 2021a.

The same national data shows that MSDs mainly affect male workers (75%), while the sectors most at risk are crafts (28.5%), agriculture (26.7%), industry (23.5%), services (18,7%) and public administration (2.9%). The main recognised causes include the repetitiveness of work, especially for injuries to the upper limbs and the manual lifting of loads for back pathologies (INAIL, 2021a).

Even if Italy generally reports a prevalence of MSDs slightly below the European average (Eurofound, 2017), national data on workers' perceptions of health and safety at work highlights a high level of attention to risks associated with MSDs and a relevant impact of musculoskeletal pains on workers' health. In 2019, a sample of workers[1] from the second wave of the National survey on perceptions of health and safety at work (known as Indagine Nazionale sulla Salute e sicurezza sul Lavoro, INSuLa-2; INAIL, 2021b) reported that ergonomic and biomechanical risks rank second among the risks to which workers feel exposed, immediately after work-related stress and psychosocial risks. Such perceptions differ slightly from the point of view of employers reporting biomechanical and ergonomic risk as the third most present risk in their enterprises (39.1%), after the risk from video display terminal (81.2%) and work-related stress risk (55.1%).

Secondary analysis of Insula-1 and 2 allowed the comparison of differences in musculoskeletal pains from 2013 to 2019 (INAIL, 2014, 2021b). Figure 2 shows a slight reduction in musculoskeletal pains suffered by workers in the 6 months prior to the survey. This decrease from 2013 to 2019 ranges from 5% to 7% in all the three musculoskeletal areas with the exception of lower limb pain, where around a 4% increase is shown.

Figure 2: Musculoskeletal pains suffered by workers in the 6 months before the survey

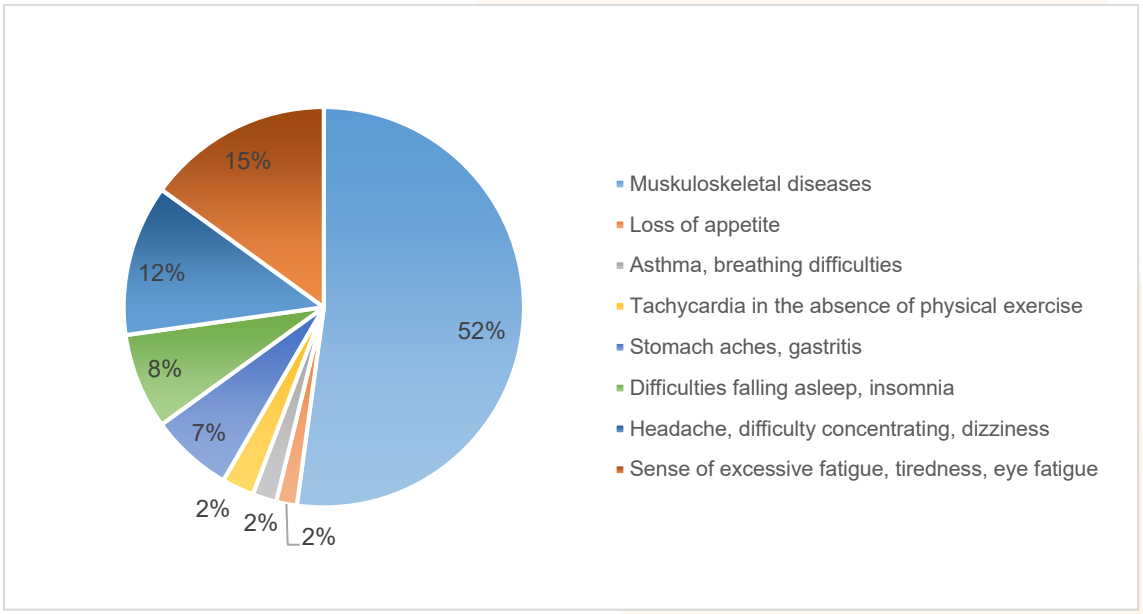


Source: Authors' elaboration on Insula 2013 and 2019 datasets (INAIL, 2014, 2021b).

[1] INSuLa is a national survey aiming to investigate the perceptions of workers and employers on health and safety at work. In each wave of the survey (conducted in 2013 and 2019), a sample of 8,000 workers representative of the national workforce and a sample of 1,000 employers, representative of all the national productive sectors were interviewed through a structured questionnaire. Further information about the questionnaire may be found in the final reports (INAIL, 2014, 2021b).

Even if a slight 5-year decrease was found, a focus on the 2019 dataset shows that musculoskeletal pains (including back, shoulder, neck, and/or upper limb and lower limb pains) accounted for 52% of pains reported by workers (Figure 3). Musculoskeletal pains are slightly more reported by women, and have a relevant increase among older workers, particularly in the age group from 45 to 54 years. Finally, musculoskeletal pains are more common among those reporting they work from 35 to 40 hours a week.

Figure 3: Workers reporting health problems suffered in the last 6 months in Italy, 2019 (%)



Source: Authors' elaboration on Insula 2019 dataset (INAIL, 2021b).

Insula 2019 data made it possible to show a link between musculoskeletal pains and psychosocial risks at work and lack of well-being. In Table 2, significant correlations are reported between the three areas of musculoskeletal pains and several psychosocial factors at work (with the exception of job insecurity) and self-reported lack of well-being.

Table 2: Correlations between musculoskeletal pains suffered by workers in the 6 months prior to the survey and some psychosocial risks and self-reported lack of well-being

	Effort Reward Imbalance	Control	Harassment and Violence	Support	Job insecurity	Mental Health
Back pain	.149**	-.028*	.085**	-.054**	-.004	.189**
Shoulders, neck and/or upper limb pain	.135**	-.023*	.073**	-.065**	.002	.173**
Lower limb pain	.110**	-.048**	.061**	-.069**	-.017	.185**

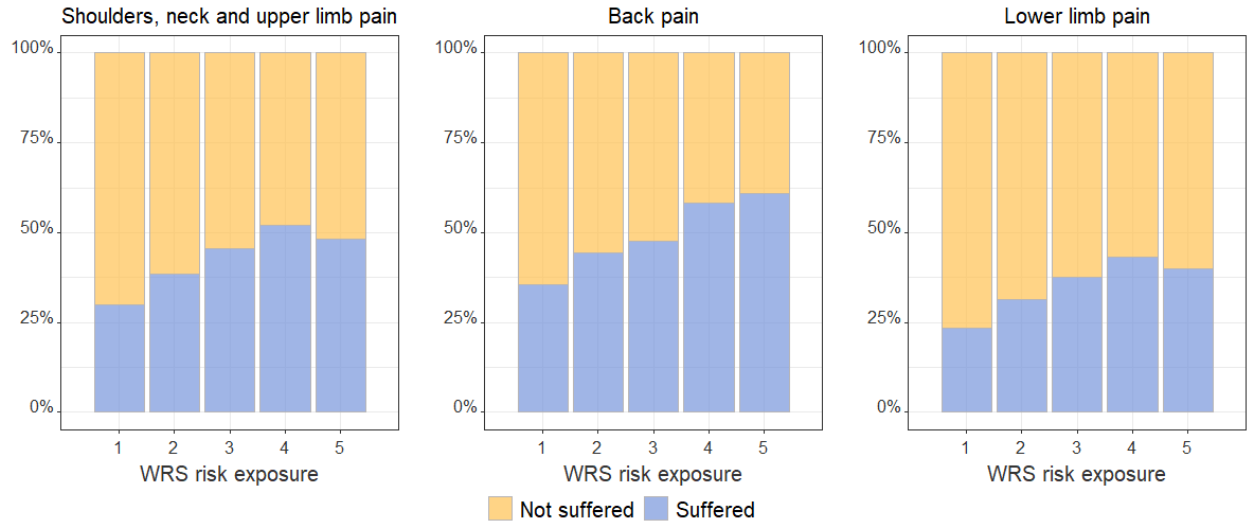
* p-value > .05

** p- value > .00

Source: Authors' elaboration on Insula 2019 dataset (INAIL, 2021b).

Figure 4 shows the response rates for the three musculoskeletal pains considered in relation to the level of work-related stress risk exposure. As the perceived risk exposure increases, the percentage of workers with one of the musculoskeletal pains considered increases too, confirming findings of a previous study on the first wave of INSuLa (Ronchetti et al., 2021). In particular, workers reporting to have suffered back pain in the 6 months before the survey are the 35% of those with a very low exposure to work-related stress risk and the more than 60% with a very high exposure. For shoulders, neck and upper limb pains, workers low exposed to work-related stress risk are about 30% and workers with a high exposure are more than 50%; for lower limbs pain, workers with a very low exposure are more than 20% and about 40% are with a very high exposure.

Figure 4: Self-reported health disorders and work-related stress risk exposure



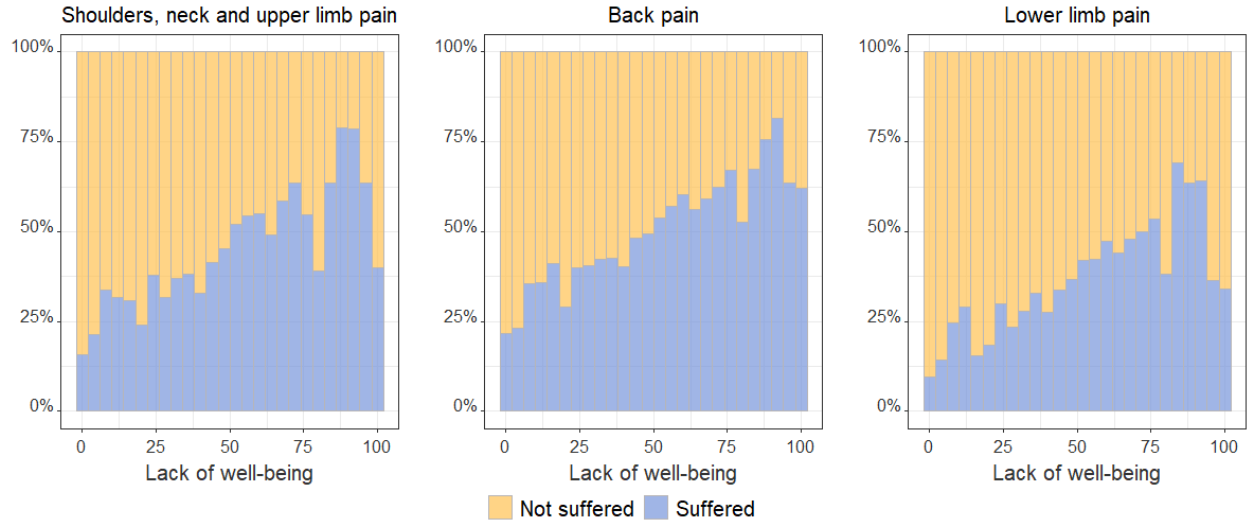
Source: Authors' elaboration on Insula 2019 dataset (INAIL, 2021b).

Note: WRS = work-related stress

Figure 5 shows the response rate for the same musculoskeletal pains in relation to the lack of well-being, measured with the WHO's Well-Being Index[2] (Topp et al., 2015). As seen for the work-related stress risk, when well-being decreases, the percentage of workers with at least one of the MSDs considered increases. More than 50% of workers reporting depression symptoms declared suffering from shoulders, neck and upper limb pains, whereas just about 35% of the workers with no depression declared the same. Considering a cut-off score of ≥72 (Löwe et al., 2004), more than 50% of the workers with major depression reported shoulders, neck and upper limb pains. Workers reporting pain are about 40% of those with no depression symptoms, 58% with depression symptoms and more than 60% with major depression symptoms. Finally, workers with no depression symptoms with lower limb pains are around 27% and workers with depression or major depression symptoms are, respectively, 45% and 46%.

[2] WHO's Well-Being Index is a generic global rating scale developed by the WHO, measuring subjective well-being and mental health through 5 items scoring from 0 (never) to 5 (always). The Insula survey has applied a reverse scoring that means the higher the score the worse the well-being is. In line with Topp and colleagues (2015), we translated to a percentage scale from 0 (maximal well-being) to 100 (absence of well-being). A cut-off score of ≥50 was used as screening diagnosis for depression symptoms and a cut-off score of ≥70 for major depressive symptoms.

Figure 5: Self-reported health disorders and lack of well-being



Source: Authors' elaboration on Insula 2019 dataset (INAIL, 2021b).

Hard and soft policies and their impact on MSDs' prevention

Promoting and maintaining health across the life course requires a renewed focus on improving musculoskeletal health at European and national levels (Briggs et al., 2018).

The need for focus on musculoskeletal health at work has been recognised and addressed at the European level by the adoption of a number of EU directives, strategies and policies over time. A first indirect reference to the prevention of work-related MSDs is included in the Framework Directive 89/391/EEC on occupational safety and health (OSH) that constitutes a basic safety and health legal act that lays down general principles concerning the prevention and protection of workers against occupational accidents and diseases. In different parts, this Framework Directive indirectly connects aspects related to work organisation and work design with ergonomic principles, such as calling for the need to adapt the work to the individual, particularly in the choice of work equipment and work and productive methods (Article 6) (Eurofound, 2007). Moreover, reference to work organisation and ergonomic principles may be found in some of the so-called daughter directives, which address different aspects of workplace risk[3]. A first direct reference to MSDs was included in Directive 89/655/EEC – then amended by Directive 2009/6/EC – concerning the minimum safety and health requirements for the use of work equipment by workers, and in Directive 89/656/EEC on minimum safety and health requirements for the use of personal protective equipment by workers.

In the 1990s, the European Commission introduced two directives more focused on prevention of MSDs, namely Directive 90/269/EEC on the minimum health and safety requirements for the manual handling of loads and Directive 90/270/EEC on the minimum safety and health requirements for work with display screen equipment. The first directive emphasises how unfavourable ergonomic conditions are the main cause of back pain for workers, and it also calls on employers to adopt organisational measures to prevent MSDs, such as organising workplaces so that manual handling is as safe and healthy as possible for workers. Similarly, the second directive underlines the importance of an in-depth analysis of workplaces 'to determine the conditions of safety and health for workers, in particular as regards any risks for the sight and problems of physical and mental fatigue'. Nevertheless, due to significant technological developments, notably in display screen equipment and workplaces, and the developing needs and capacities of an ageing workforce, the European Commission has initiated a further relevant legislative update by reviewing the workplace Directive 89/654/EEC and the display

[3] Directive 89/654 /EEC concerning the minimum safety and health requirements for the workplace. Directive 2002/44/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration). Directive 2003/88/EC concerning certain aspects of the organisation of working time.

screen equipment Directive 90/270/EEC (European Commission, 2021). All such references to ergonomic principles in the organisation of work offered by some means a first link between psychosocial factors at work and prevention of MSDs. Since the 2000s, the European Commission has placed particular importance on the prevention of emerging risks for workers, through the adoption of an integrated approach where well-being at work is the focus of workers' protection. In this regard, with the adoption of the European strategies for health and safety at work (2002-2006 and 2007-2012), the European Commission has drawn attention to emerging risks and declared its commitment to adapt existing legislation to the emerging problems related to musculoskeletal complaints, which together with asbestos and hearing lost were considered the main occupational diseases (European Commission, 2002, 2007). The subsequent European strategies for health and safety at work (2014-2020 and 2021-2027) focused on the need to prevent the negative impact of new technologies on workers' health and safety, and particularly on the impact of changes to work organisation on the physical and psychological aspects, introducing a multifactorial view. The prevention of work-related MSDs was also included as a topic by the European and international standards organisations[4] (European Commission, 2014, 2021).

Differently from the European 'hard' policies, some European initiatives and proposals from EU institutions and bodies addressed MSDs and also brought to light psychosocial risks and their effect in the development or worsening of MSDs. Among them, the EU-OSHA campaigns play a remarkable role in promoting well-being at work and in preventing MSDs. The current EU-OSHA 2020-2022 campaign 'Healthy Workplaces Lighten the Load' intends to raise awareness of work-related MSDs, to improve knowledge of new and emerging risks associated with MSDs, and to disseminate information about how they can be effectively prevented and managed (EU-OSHA, 2020). Psychosocial risks are widely recognised in such initiatives as occupational aspects that can potentially raise the risk of MSDs. Nevertheless, more efforts at policy level are required in order to coordinate workplace interventions, measures and actions within organisations in this direction.

Improvements in the management of psychosocial risks in Europe in the last 10 years may represent a lesson learned on the driving role of hard and soft policies in raising awareness and pushing action in prevention of occupational health risks (Leka et al., 2015). Work-related stress already represented a priority for workers' health and safety among OSH specialists and stakeholders 16 years ago (Iavicoli et al., 2001), but it remained just a research priority without any practical solution in organisations for several years. Efforts made in the last decade at policy level contributed to overcoming the existing gap between research and practice, confirming the role of policies in increasing awareness and driving action (Leka et al., 2015). After the establishment of the obligation of employers to assess and manage in a preventive manner all types of OSH risks, including psychosocial ones, stated by the European Framework Directive 89/391/EEC, following soft policies and procedures clarified how to manage psychosocial risks in workplaces (European Commission, 2014). The most relevant are the European framework agreements among European social parties on work-related stress and on harassment and violence at work (respectively in 2004 and 2007) that were then implemented at national level by most Member States in different ways (European Commission, 2011, 2016). The aforementioned agreements made it possible to clarify and to share definitions and methods to assess and manage psychosocial risks along with all other risks for health and safety. Among other countries, the national case of Italy showed a huge increase between 2009 and 2014 in actions to prevent work-related stress through practical interventions for the management of psychosocial risks in organisations, which confirmed the crucial role of binding and non-binding/voluntary policies (Di Tecco et al., 2017).

In consideration of the multifactorial nature of MSDs the main challenge in preventing work-related MSDs is advancing a multidisciplinary approach to health policy and strategy at European and national system levels to boost the development of models, approaches and practical tools oriented towards assessing and managing all the potential determinants of MSDs in an integrative manner.

[4] European Committee for Standardisation; International Standardisation Organisation.

Towards an integrated approach to manage and prevent MSDs

MSDs continue to pose a significant prevention challenge because of their prevalence at European and national levels, which remains high despite related efforts over the past decades. Difficulties in prevention may also relies in the complexity of the wide range of factors involved, such as work-related determinants and individual susceptibility factors.

For this reason, it is becoming ever more evident that MSD prevention efforts must be based on a holistic, multidisciplinary and integrated approach that combines public health interventions with occupational health interventions, promoting a link between workers' health, work organisation and work environment in terms of protection, prevention and promotion. Also, in view of the ageing of the workforce and rapid changes to the world of work, the focus of health prevention should be moved to the monitoring of work ability and well-being promotion across the work life course (Briggs et al., 2018; Russo et al., 2020). This means that the management of psychosocial and work organisational factors must be coordinated with biomechanical, ergonomic and medical aspects through a more effective involvement of and cooperation among organisational and community stakeholders (e.g. employer, employees, occupational physicians, prevention experts, policymakers, researchers from a broad array of disciplines, etc.) in order to improve the efficacy of MSD prevention. A long-term policy promoting integrated multidimensional interventions of prevention tailored to technical, organisational and economic features of workplaces would represent a driver in integrating different aspects of risk prevention with health promotion. This allows in turn to develop integrated risk assessment and management methods and interventions in organizations based on preventive approaches taking into account determinants of MSDs overall. The complexity of these multidisciplinary interrelationships represents a major challenge when it comes to negotiating and drafting new legislation 'against MSDs' at EU level with a view to introducing more sustainable and socially responsible production models within the EU (Roquelaure, 2016, 2018).

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