European Agency for Safety and Health at Work

Musculoskeletal disorders: association with psychosocial risk factors at work

Executive Summary

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Executive summary

What did we find?

- **Psychosocial risk factors can combine with physical risk factors to cause MSDs.**

The review demonstrated that there is clear evidence that psychosocial risk factors play a causal role in the development of musculoskeletal disorders (MSDs) in the workplace. They do not act in isolation but their effect combines with (and often exacerbates) the effects of physical risk factors. The associations between psychosocial and physical risk factors and MSDs identified in the research literature are many and varied; however, it is not possible to identify consistent patterns in those associations. Thus, although factors such as high workload or a lack of social support can be shown to contribute to the development of MSDs, it is not possible to relate these or other particular psychosocial risk factors to specific MSDs.

There was no evidence to suggest that particular groups of workers were more susceptible to developing MSDs, although certain risks were more often encountered in specific sectors, placing those working in those sectors at greater risk from the influence of psychosocial factors.

Importantly, the negative association between psychosocial factors and MSDs can work both ways. Such factors can materially contribute to the causation of MSDs, but having an MSD can exacerbate or accentuate the perception of some psychosocial factors. This is of particular potential importance in influencing the chronic nature of some MSDs; it can be an important potential barrier to successfully rehabilitating those workers with an MSD and bringing them back into the workforce.

Furthermore, the effects of some psychosocial factors are not necessarily negative. Some factors can have a positive effect. For example, there is evidence that good job control can mitigate the otherwise negative effects of high job demands.

- **Many conceptual models of the relationships between workplace risks and MSDs have been developed.**

Many attempts have been made to present the complex relationships between workplace risk factors, the individual and MSDs in the form of conceptual models. An ideal model should incorporate both physical and psychosocial workplace risk factors and reflect the interactions between them. However, any such model should also acknowledge the potential influence of the external (non-work) environment. In the same way that individual physical fitness and related factors moderate the impact of workplace physical factors, an individual's external psychological milieu can moderate the impact of workplace psychosocial factors. Although detailed consideration of such elements arguably takes the model beyond the scope of the workplace, it is necessary to include some acknowledgement of the potential moderating contribution of 'individual susceptibility' in modelling all the elements influencing the impact of psychosocial factors on the onset of MSDs.

Any such model should also illustrate the potential two-way influence of some individual psychosocial factors. Thus, it should reflect the potential moderating effects of factors such as high levels of social support or of job control in reducing the impact of other factors such as high job demands.

It should also reflect the fact that the relationships and influences can be regarded as a 'dynamic equilibrium', with the factors acting on the worker and the responses to those feeding back to further moderate any relationship. This reflects the two-way nature of the relationship between MSDs and psychosocial factors, in which the emergence of MSD symptoms can contribute to the significance of psychosocial factors, such as the levels of job demand and job satisfaction. In this way, the experience of an MSD can feed back to the long-term response modulating the perception of the psychosocial environment by the individual.

So far, many of the models presented in the literature reflect mechanisms and pathways for the primary causation of MSDs. However, a considerable proportion of the negative impact of MSDs (on both workers and employers) arises not from MSDs primarily caused by workplace factors but from chronic MSDs in which both physical and psychosocial risk factors can provoke symptoms or possibly aggravate the underlying disorder. In such cases, MSD symptoms can persist and make it difficult for workers to either remain in work or return to work (rehabilitation). There is a need for some debate over the purpose

and function of such models. As part of this, consideration should be given to whether, in the interest of providing a complete picture, any model should incorporate the factors that influence chronicity and rehabilitation as well as primary causation.

- **The mechanism through which psychosocial risks exert their influence is not entirely clear.**

It is clear that psychosocial risk factors do contribute to both the primary causation of MSDs and the often persistent nature of their symptoms. What is currently unclear is the mechanism through which such effects are mediated. Although a number of biological pathways have been put forward, these have yet to be confirmed.

Possible explanatory mechanisms include:

- Psychosocial demands may produce increased muscle tension and exacerbate task-related biomechanical strain.
- Psychosocial demands may affect awareness and reporting of musculoskeletal symptoms and/or perceptions of their cause.
- Initial episodes of pain based on a physical insult may trigger a chronic nervous system dysfunction, physiological and psychological, which perpetuates a chronic pain process.
- Changes in psychosocial demands may be associated with changes in physical demands and biomechanical stresses, and thus associations between psychosocial demands and MSDs occur through either a causal or an effect-modifying relationship.

It has been suggested that neuroendocrine response mechanisms underlie several of these.

A number of them are not mutually exclusive and it is likely that the causal process is attributable to a combination of two or more of them acting in tandem. However, the fact that we do not yet understand exactly how psychosocial risk factors influence MSD risk should not present a barrier to taking action.

- **There are limitations to the research evidence available on psychosocial risk factors and MSDs.**

Although some psychosocial risk factors, such as psychological or sexual harassment and violence, can have readily discernible consequences, the current research evidence does not in general permit specific psychosocial risk factors to be associated with particular MSDs. This is not unusual in that similar considerations apply with physical risk factors, as it is seldom possible to isolate the extent of the contribution to overall risk of any individual physical risk factor. There is evidence from workplace investigations to suggest that adopting an undue focus on one particular factor (such as the weight of loads being handled) is less likely to be effective in reducing the risk of MSDs (or their consequences in the case of chronic MSDs) than the holistic approach advocated above. Thus, all psychosocial risk factors should be assessed and action taken to reduce those most prevalent, without seeking to relate these to specific MSD risks.

- **Workplace interventions should be developed to address the increased risk of MSDs due to psychosocial risks.**

To date, although there is guidance from the literature on what any workplace intervention should include, no reports have been found of formal evaluations of the effectiveness of any such interventions in practice. Although there are reports of interventions addressing MSDs, these have largely focused on physical risk factors. Similarly, interventions that address psychosocial risks have been identified, although the focus of these has been on the prevention of adverse psychological consequences.

It is clear from the literature that any workplace interventions addressing psychosocial risks and MSDs need to adopt a holistic approach, reflecting the multifactorial causality of such MSDs. Any such approach should address both psychosocial and physical risk factors. There is evidence to support adopting a participatory approach in any intervention, with all levels of the workforce committed to the need for action and to positively contributing to that action at all stages.

A recent discussion paper by the European Agency for Safety and Health at Work (EU-OSHA, 2021)[1] concluded that a participatory approach improves the identification of relevant risks and assists the workforce in assessing risks and finding solutions.

Especially when the intention of the intervention is rehabilitation rather than (or as well as) primary prevention, some attention should also be directed towards individual factors. This should aim to enhance the worker's physical and psychological resilience, again reflecting a holistic approach.

However, although the individual is important, any intervention strategy should avoid adopting an undue focus on individual workers. As with any workplace risk, removing or reducing any risk at source is, apart from a legal obligation, an option more likely to provide a successful outcome. Experience has shown that interventions that solely seek to enhance resilience without addressing the workplace risk factors are less likely to succeed.

- **A systematic intervention strategy to identify and reduce risks is required.**

In designing and implementing any intervention strategy, the first priority is to gain the positive commitment of those at all levels in the organisation, ranging from the workers through to supervisors, middle managers and senior managers. Although physical interventions can often be easily adopted at the workplace level, addressing psychosocial risk factors frequently entails organisational change, requiring recognition and commitment at all levels.

Reflecting the holistic approach to prevention, any intervention strategy needs the involvement and participation of all levels within the workforce. Participation should be an active process, with consultation and discussion at all stages of the risk prevention cycle. As noted above, successful interventions are more likely to arise through such active involvement than through a 'passive' imposition of change without such consultation and discussion.

Participation should continue throughout the process, engaging all levels of the workforce, not just in identifying risks but also in devising and then actively implementing appropriate solutions.

What guidance on interventions can we provide?

Although no formal evaluations of intervention strategies were identified, it was possible to use the available research evidence to determine what any such intervention should include. Building on established recognised good practice for effective workplace interventions in general, it was also possible to identify the key elements of a potentially effective strategy.

- **Commitment.** First, at all levels in the workplace there needs to be recognition of and commitment to a requirement to address both the physical and psychosocial risks of MSDs.
- **Holistic risk assessment adopting a participatory approach.** This should be followed by a systematic, holistic approach to risk assessment, covering both physical and psychosocial risks. As with physical risk factors, the assessment of psychosocial risk needs to adopt a comprehensive approach, taking a broad view to assess all potential risks and not seeking to focus on a selection. The risk assessment process requires management commitment and should actively involve the workforce, and it should ensure that actual work activities are assessed, not what is believed to happen.
- **Encourage and support an honest and open approach.** Because of the individual focus of many psychosocial risk assessment tools, adequately assessing psychosocial risk factors requires openness and honesty on the part of the workforce. Appropriate measures should be in place to safeguard and protect individual confidentiality. As part of this, assessing physical and psychosocial health and well-being will also be of value in identifying where action is most needed.

[1] EU-OSHA. (2021). *Participatory ergonomics and preventing musculoskeletal disorders in the workplace*. Discussion paper. Available at: https://osha.europa.eu/en/publications/participatory-ergonomics-and-preventing-musculoskeletal-disorders-workplace/view

- **Multiple effects.** It should be remembered that psychosocial risk factors can have a direct negative impact on psychological health and well-being and on MSDs. In addition, as well as contributing to the development of MSDs, psychosocial factors can create barriers to returning to work for those with chronic MSDs.
- **Risk prevention.** Risk assessment is a means to an end — not an end in itself — and requires the implementation of preventive and corrective measures. As with risk assessment, identifying and developing any follow-up actions should involve the workforce. Evidence suggests that solutions developed collaboratively are more likely to be successful. Furthermore, there is some evidence that a multifactorial approach to prevention is more effective than addressing single risk factors, both in primary prevention and in rehabilitation. Some psychosocial factors can work positively — especially positive support from co-workers and managers. Ideally such support should develop as part of an open and supportive culture. Where appropriate, it might be necessary to enshrine more formal support procedures into systems of work and, where necessary, ensure that supervisors and managers have the necessary training to understand and apply such systems. Some factors can work on both physical and psychosocial risks. For example, enabling greater individual freedom over scheduling work breaks (when possible) can act directly to reduce physical strain and provide a greater sense of personal control. This can lead to clear and comprehensive benefits. Addressing psychological and sexual harassment (where identified) should be a priority, as this can seriously affect both physical and psychosocial health.
- **Ongoing review.** Where changes in work and work systems are required, provisions should be made to ensure that such changes are introduced and maintained. Experience suggests that, without the necessary reinforcement, reversion to the status quo is often the norm. As part of this ongoing process, and in keeping with recognised good practice, workplace risks should be periodically reassessed, partly to confirm that any risk reduction measures are being correctly implemented and partly in recognition of the fact that many workplaces are dynamic places in which risks can change and new risks can emerge. In many instances, communication and collaboration and involvement are key, ensuring that change is explained and cascaded down within the workforce. Again, practical experience suggests that change introduced or enforced without such involvement can lead to resentment, a lack of commitment and cooperation and, eventually, system failure.
- **Rehabilitation, not just initial prevention.** The complexity of interacting factors with respect to rehabilitation and the prevention of recurrence (where individual psychological barriers to returning also have to be taken into account) can make such a multifactorial approach even more necessary, compared with initial prevention.

What further research is required?

Although it is possible to establish that psychosocial risk factors can materially contribute to the causation or exacerbation of MSDs in the workplace, there remains a clear need to explore this complex relationship further, in particular to understand the relative contribution of exposure to different risks and consequent responses.

At present there is no clear understanding of the biological mechanisms through which the influences of psychosocial risk factors are mediated. This is important, as it helps to establish the ‘biological plausibility’ of such effects. There is little evidence to suggest differential effects, whereby different psychosocial risks contribute more to some MSDs than others. This is an important consideration in exploring these causal mechanisms and should be examined further.

As with physical risk factors, not all psychosocial factors create a causal risk in all circumstances. In addition, as noted above, current research evidence suggests that these factors do not exert their influence in a manner that would enable individual factors to be associated with specific MSDs. Further research efforts would therefore be best directed towards identifying methods to quantify the overall

'psychosocial load' in a manner that best reflects the risk of MSD injury generated by that load, rather than any focus on individual risk factors.

Although causation and the causal mechanisms are not fully understood, this should not be regarded as a barrier to taking ameliorative action. At present, although many suggestions have been put forward to reflect strategic approaches to reduce the effect of psychosocial risks on MSDs, none have as yet been found to be adequately evaluated. There is a body of research to indicate the probable content of any course of action and further research-based evidence to guide any evaluation.

It is unlikely that significant differences will emerge in the relationship between workplace psychosocial risk factors and those MSDs considered to be caused by work, compared with those in which work factors exacerbate the ongoing development of underlying (perhaps degenerative) MSD problems. However, there are clearly further individual psychological factors that potentially affect the persistence of MSDs and their symptoms, together with the rehabilitation process. The role of such psychosocial factors in rehabilitating those with MSDs into the workplace (and retaining those still working in the case of rehabilitation and retention in particular) remains to be better understood. Understanding the psychological and the physical barriers to rehabilitation is vital, as there is clear evidence that ongoing MSDs present at least as great a burden to industry (and to the individual sufferer) as the initial occurrence of MSDs in the workplace.

Given the evidence that the assessment of physical factors alone is inadequate, there seems to be limited evidence of psychosocial factors being readily and widely assimilated into the MSD risk assessment process at present. There is therefore a clear need for the development of suitable tools or procedural approaches to facilitate holistic risk assessments and their widespread promotion and advocacy within industry.

What did we do to find this?

Literature search methodology

The evidence and guidance summarised above was drawn from a careful examination and interpretation of the relevant research literature, following a rigid systematic review methodology. This process provided an extensive catalogue of literature, which was then screened, following an agreed template, to identify the most relevant papers. The study reflected a strong focus on material likely to provide an evidential basis for a causal role for psychosocial risk factors and MSDs. This therefore largely excluded cross-sectional studies, as such material provides evidence for 'associations' between the risk factors and outcomes of interest that are not necessarily causal. As a result of this process, 53 papers were retained for inclusion.

This database was supplemented by additional published material identified through a number of channels. Some additional material was derived from the literature identified through the searches (e.g. by reverting to the original source material presented in a review). In addition, some of the material accessed was added later, having not been published until after the main searches were conducted. In other instances, material was identified as being of relevance to the emerging issues covered during the review. The resultant review is therefore not limited to those studies identified through the formal search process.

In addition, although the main focus was on literature published in the peer-reviewed scientific domain, searches included 'grey' literature, derived from sources such as governmental or international bodies. This included material emanating from EU-OSHA, reflecting the strong focus on both MSDs and psychosocial risks (and their prevention) in recent years, related to the Healthy Workplaces Campaign 'Lighten the Load' (2020-22).[2]

The review focused on:

- the evidence for contributory risk factors for the association between psychosocial risk factors and MSDs;

[2] https://healthy-workplaces.eu/

- an overview of conceptual models explaining the relationship between psychosocial risks and MSDs;
- intervention strategies, including evidence for what would probably constitute an effective strategy and designing an effective strategy;
- good practice identified for preventing MSDs associated with psychosocial risks (and psychosocial risks associated with MSDs).

As part of this, the review considered what evidence there was for particular risks to be associated with different work sectors (including company size) or for particular groups of workers within those (or other) sectors.

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