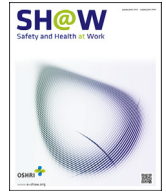


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Short Communication

Promoting a Shared Representation of Workers' Activities to Improve Integrated Prevention of Work-Related Musculoskeletal Disorders[☆]

Yves Roquelaure^{1,2,3}¹ University of Angers, Laboratory of Ergonomics and Epidemiology in Occupational Health (LEEST), Angers, France² Research Institute for Environmental and Occupational Health (IRSET), Rennes, France³ University Hospital, Angers, France

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ABSTRACT

Effective and sustainable prevention of work-related musculoskeletal disorders (WR-MSDs) remains a challenge for preventers and policy makers. Coordination of stakeholders involved in the prevention of WR-MSDs is a key factor that requires greater reflection on common knowledge and shared representation of workers' activities among stakeholders. Information on workers' strategies and operational leeway should be the core of common representations, because it places workers at the center of the "work situation system" considered by the intervention models. Participatory ergonomics permitting debates among stakeholders about workers' activity and strategies to cope with the work constraints in practice could help them to share representations of the "work situation system" and cooperate. Sharing representation therefore represents a useful tool for prevention, and preventers should provide sufficient space and time for dialogue and discussion of workers' activities among stakeholders during the conception, implementation, and management of integrated prevention programs.

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Work-related musculoskeletal disorders (WR-MSDs) of the back (e.g., cervical and low back pain) and upper limbs (e.g., shoulder tendinopathy and carpal tunnel syndrome) are the main causes of work-related disorders and occupational diseases in most countries [1,2]. WR-MSDs are responsible for pain, difficulty performing work-related tasks, and long periods of absence from work and disability in the workforce. They engender high social and economic costs [1,2] and contribute to high levels of social inequality in health in many countries, as they mainly affect unskilled and poorly skilled workers. Such inequalities are partially avoidable, because a substantial proportion of WR-MSDs could be prevented by workplace interventions [1,3].

Prevention of WR-MSDs remains a challenge despite the scientific knowledge accumulated for 2 decades [4]. These difficulties in preventing WR-MSDs can be explained by the complexity of their determinants, involving not only biomechanical overuse of the soft tissues but also psychosocial interactions and stress at work, and work organization at work situation and company levels. Moreover,

the implementation of effective and sustainable programs of WR-MSDs remains a challenge for preventers and policy makers in ever-changing industrial environments, meaning that very few interventions are actually implemented in companies [4–6].

In this paper, we focus on the need for sharing knowledge on WR-MSDs, workers' activities and prevention strategies among stakeholders (e.g., managers, trades unions, workers, preventers, physicians, insurers) in order to facilitate their cooperation and, finally, ameliorate the effectiveness of preventive interventions.

Several risk models for WR-MSDs have been proposed in the literature focusing on the biomechanical [7], psychosocial [8], and organizational dimensions of WR-MSDs [9]. In practice, these conceptualizations of WR-MSDs coexist among stakeholders in companies and institutions in charge of the prevention of occupational disorders. The classical biomechanical model is based on the imbalance between soft tissue strains, determined by exposure to high forces, awkward postures and repetitive movements, and the worker's functional capacities [7]. Functional capacities are difficult

Laboratory of Ergonomics and Epidemiology in Occupational Health, Faculty of Medicine, University of Angers, Rue Haute de Reculée, 49045 Angers Cedex, France.

E-mail address: yvroquelaure@chu-angers.fr.

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to assess accurately, because the biomechanical constraints vary according to many factors, namely, posture, duration of exposure, and individual characteristics (age, previous MSDs, diabetes, etc.). The biopsychosocial and organizational risk models of WR-MSDs are more pertinent than the classical biomedical model for preventive purposes because they help preventers to take into account the complexity of their determinants. According to these models, the multifactorial nature of WR-MSDs justifies a multidimensional approach based on a global and systemic approach in assessment of the work situation in order to identify the various constraints and their determinants with reference to a multifactorial and multilevel model of WR-MSDs (Fig. 1). Indeed, such an integrated multidimensional and multilevel conceptual model of WR-MSDs takes into account not only biomechanical and psychosocial factors at the work situation level, as for the biopsychosocial risk models [1], but also factors related to work organization at the work situation level. The latter factors determine the biomechanical and psychosocial factors of the work situation, and thus indirectly the working constraints with which the workers have to cope [10]. Factors related to the work organization and management practices have also to be assessed at the company level, as they, in turn, determine the organization at the work situation level and certain psychosocial risk factors. Finally, more general “macro ergonomic” risk factors related to the economic, social, and political environment at market and society levels should be evaluated. Such an integrated multidimensional and multilevel conceptual model suggests enlarging the scope of the assessment of risk factors: (1) biomechanical factors at the job station level; (2) psychosocial and stress factors at the job and work situation levels; (3) organizational factors at work situation and company levels; and (4) socioeconomic factors at the society level. Several ergonomic studies support such an integrated multidimensional conceptual model [9–11], however, epidemiological findings are still sparse.

According to the World Health Organization, “Workers’ health global plan of action 2008–2017” [12] and systematic reviews [5,13–15], prevention programs must combine simultaneous interventions at three levels of prevention: (1) primary prevention, to limit the incidence of WR-MSDs by risk reduction at the source; (2) secondary prevention, to avoid worsening pain and difficulties at work; and (3) tertiary prevention, to facilitate remaining at work

and/or early return to work of workers experiencing chronic pain and disability. The combined three-level intervention is expected to increase overall preventive efficacy because, even when primary interventions on work situations remain ineffective, the severity of disorders can be reduced and their prognosis in terms of work ability improved by interventions at any stage (from acute to chronic) of WR-MSDs. Evidence-based multidimensional interventions combine workers’ training sessions, physical and organizational ergonomics, and physical exercise programs [5,13–15]. They produce both short- and long-term effects by coordinating actions with different time frames in order to increase the sustainability of the preventive effects. For example, technical improvement of job stations will decrease biomechanical strains and enhance short-term preventive effects, whereas health promotion should modify workers’ behavior in the long term. From a conceptual point of view, various risk models for WR-MSDs should be combined when designing such integrated prevention programs: (1) a biomechanical model; (2) a biopsychosocial model; and (3) an ergonomic organizational model. On the one hand, the technical approach of prevention, such as ergonomics of workstations and equipment, aiming to decrease biomechanical exposure, is based on a biomechanical model of WR-MSDs. On the other hand, the psychological approach, such as interventions regarding social relationships and stress factors and return-to-work interventions involving physical and psychological reconditioning, is based on a biopsychosocial model of the disorders and related incapacity. Finally, the systemic approach of prevention, such as participatory ergonomics, with intervention regarding workstations, work organization, management practices, and individual/collective empowerment, is mainly based on an ergonomic organizational model of WR-MSDs and their determinants. Such prevention programs involve a large number of stakeholders both within and outside the company, all with various backgrounds and differences in professional practice. They need, therefore, to be well coordinated [16,17].

The effectiveness of preventive interventions relies not only on their theoretical efficacy, but also on the quality of their implementation. In practice, implementing such complex interventions encounters many obstacles depending on the features of the local context (company, regulation, quality of occupational health and

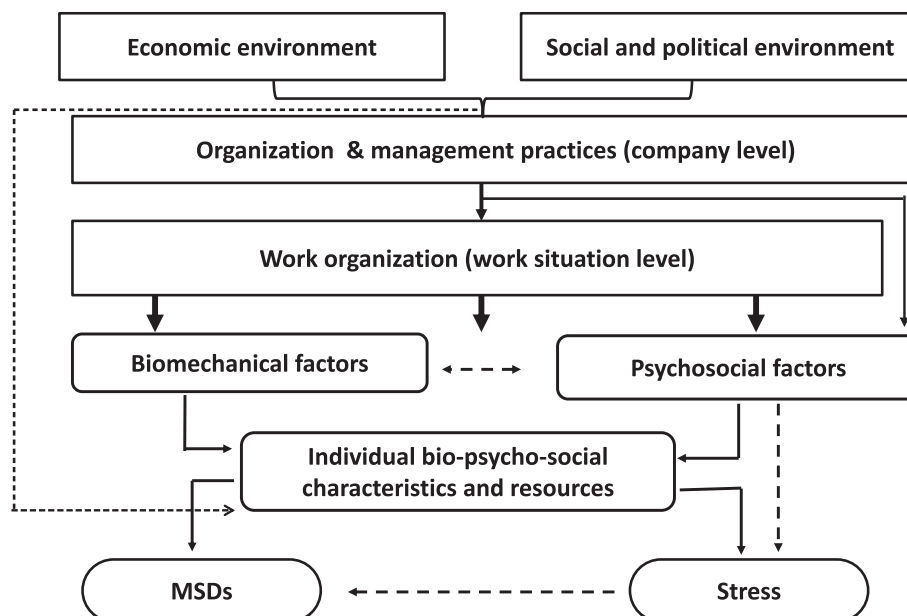


Fig. 1. Integrated multidimensional conceptual model of work-related musculoskeletal disorders (MSDs).

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