



Review article

Prevention of musculoskeletal disorders within management systems: A scoping review of practices, approaches, and techniques



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ABSTRACT

The purpose of this study was to identify and summarize the current research evidence on approaches to preventing musculoskeletal disorders (MSD) within Occupational Health and Safety Management Systems (OHSMS). Databases in business, engineering, and health and safety were searched and 718 potentially relevant publications were identified and examined for their relevance. Twenty-one papers met the selection criteria and were subjected to thematic analysis. There was very little literature describing the integration of MSD risk assessment and prevention into management systems. This lack of information may isolate MSD prevention, leading to difficulties in preventing these disorders at an organizational level. The findings of this review argue for further research to integrate MSD prevention into management systems and to evaluate the effectiveness of the approach.

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1. Introduction

Musculoskeletal disorders (MSD) represent a large proportion of work-related disabilities in most countries (NRC, 2001). MSD have a substantial work-related component and a consistent set of workplace risk factors including forces exerted, the postures required, the time history of the mechanical exposure, vibration, cold, contact stress, and a range of psychosocial factors (Bernard, 1997; NRC, 2001). MSD negatively impact the worker, firm, and the economy by increasing discomfort, pain, disability, and medical costs, as well as decreasing productivity and employee morale (Martin et al., 2003; Morse, 1999). Hence, as a result of these adverse effects, the prevention of these disorders should be a high priority.

It is the responsibility of organizations to provide safe working conditions through anticipation, identification, assessment, and control of a wide range of hazards in the workplace. If these activities are performed within some organizational level framework, it may be considered a “management system”. More formally, a management system is defined as a framework of individual processes, procedures, and resources to ensure effective and efficient achievement of certain objectives (Karapetrovic and Willborn, 1998). Three key internal management systems are: Environmental Management Systems (EMS), Quality Management Systems (QMS), and Occupational Health and Safety Management Systems (OHSMS). Several standards and guidelines have been developed over the years to guide organizations in implementing these management systems, for instance, the Occupational Health and Safety Assessment Series (OHSAS 18001), BS 8800, International Labor Organization guidelines, Health and Safety Executive guide (HSE, 2007), QMS standard (ISO 9001) developed by International Organization for Standardization (ISO), and EMS standard (ISO 14001). OHSAS 18001 is a framework developed to provide a

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“recognizable” health and safety management system that has the potential to be assessed and certified against organizations’ management systems. This framework includes elements aiming to improve health and safety systematically. Often, organizations integrate separate management systems (quality, environmental, health and safety, etc.) to increase efficiency and reduce costs; this model is known as an integrated management system (IMS). These management system frameworks are typically based on the Plan-Do-Check-Act (PDCA) model (Deming, 1986) of continuous improvement.

We adopted the definition of ergonomics provided by International Ergonomics Association (IEA), which includes aspects of physical, cognitive, and work organizational factors (IEA, 2000). In the literature, ergonomics appears to be frequently used as a synonym for MSD prevention. Therefore, where applicable, we will clarify which meaning has been used by different authors. Participative Ergonomics (PE) practices are commonly presented as a desirable approach for the prevention of MSD (Noro and Imada, 1991). Ergonomic programs for the prevention of MSD vary in complexity, but most of those reported in the literature appear to be set up in isolation from management system frameworks (Yazdani et al., 2015). This isolation was perhaps first conceived to highlight the work-relatedness of MSD and to increase the awareness that these disorders are as important as acute injuries. However, it is unclear why this general isolation still exists. Furthermore, there remain questions of the possible challenges and barriers that could obstruct the integration of MSD prevention into existing broader management systems.

The purpose of this study was therefore to both identify and summarize the available evidence on embedding the prevention of MSD within OHSMS and thus integrating this specific aspect of prevention into an organization’s management system.

2. Methods

We were uncertain about the nature and extent of the literature on the topic and therefore performed a scoping review. As defined by Mays et al. (2001), a scoping review is a literature review methodology that maps the key concepts to examine research questions and evidence. This could be done through a stand-alone project where researchers aim to address a complex research area, or an area that has not been previously comprehensively reviewed (Mays et al., 2001; Arksey and O’Malley, 2005). It follows a methodology that is equivalent to qualitative analysis of literature. Scoping reviews not only itemize and summarize the existing findings on a topic, but also facilitate an in-depth understanding of how those findings relate to each other and to the research question (Poth and Ross, 2009). For the purpose of this paper, we used a framework by Arksey and O’Malley (2005). The authors identified four different reasons to conduct a scoping review: (a) to examine the extent, range, and nature of research activity, (b) to determine the value of undertaking a full systematic review, (c) to summarize and disseminate research findings, and (d) to identify gaps in the existing research literature. Reasons (a) and (d) matched the aims of this paper.

2.1. Scoping review process

The process used in this review was similar to those outlined by Arksey and O’Malley (2005) and consisted of the following steps: (1) the research questions were clearly identified; (2) the inclusion and exclusion criteria were described; (3) search schemes were defined; (4) the literature search was conducted; (5) relevant studies were selected; (6) the evidence was extracted and data were tabulated, and (7) the results of the review were summarized.

2.2. Research question

What is known about preventing MSD within OHSMS and other management systems and how can these MSD prevention activities be integrated into an organization’s management system?

2.3. Literature search outline

The search strategy combined two sets of keywords using the Boolean operator “AND”, while an “OR” strategy was used to combine the keywords within each group. In addition, the reference lists of documents were manually searched, in case they met the inclusion criteria. The first set of keywords was focused on the following terms: musculoskeletal disorders (MSD), ergonomics, low back pain, cumulative trauma disorders (CTD), upper extremities, repetitive strain injuries (RSI), musculoskeletal injuries (MSI), and injury prevention. The following keywords were used as the second set for management systems: occupational health and safety management system, health and safety management system, integrated management system, quality management system, total quality management system, risk assessment, and risk management. The keywords were searched in the titles, abstracts, and topics of documents. A title and abstract that contain one term from each group of keywords were considered to be eligible for this review.

2.4. Literature search

Electronic databases that were searched for relevant documents included MEDLINE, EMBASE, Compendex, Web of Science, PsycINFO, Ergonomic Abstracts, and 44 other databases using the ProQuest search platform. These databases include a wide range of journals in the fields of health, business, management, and science. The databases were searched for English language studies.

2.5. Inclusion and exclusion criteria

This paper included peer reviewed journal articles and conference papers aiming to describe injury prevention practices and approaches within any management system frameworks, such as OHSMS, QMS, and IMS. We included papers published up to February 2012. The search was updated on April 2014 to extract the most recent literature. Both qualitative and quantitative studies were included. This review excluded studies that lacked information about integration of prevention into management system using assessment techniques, strategies, and approaches. Also, articles not written in English were excluded.

2.6. Document relevance review

One reviewer screened the title and abstract of each article. If the reviewer could not make a decision on relevancy of articles, an additional reviewer was asked to repeat the process. Those articles determined to meet the inclusion criteria were retrieved. Then, the articles were independently reviewed by pairs of reviewers to make a decision on the retention of the article. The decision for each paper was made by reaching consensus.

2.7. Data extraction and synthesis of information

Pairs of reviewers extracted data from articles on context, type of risk assessment techniques, strategies, techniques within management systems, and any authors’ comments or recommendations related to MSD prevention within a management system. A thematic synthesis technique was used to combine the findings. This

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