

Reviews

Occupational medicine and ergonomics: a new paradigm for improved management of ergonomic risks

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Abstract

Despite the existence of numerous initiatives and methods to prevent occupational risks and improve workplace well-being, musculoskeletal disorders (MSDs) remain a major health concern in European countries. Without doubt, the cause of this worrying situation is multifactorial, and various disease management approaches have been proposed in the scientific literature. However, the authors of this article identified a gap that should be considered: collaboration between occupational health professionals and ergonomists would lead to more efficient ergonomic interventions and proper implementation of proactive measures for occupational health and safety. The paper presents a brief literature review and proposes a methodological framework that englobes the cooperation of occupational health professionals and ergonomists for implementation of ergonomic interventions.

Keywords: ergonomics, occupational medicine, ergonomic risks, work-related musculoskeletal disorders, prevention

Introduction

In Romania, occupational health professionals have a variety of responsibilities related to worker health and negative results of exposure to occupational risks. To address all these responsibilities, occupational health professionals need to have solid knowledge in fields related to ergonomics science and practice. However, the ergonomist typically deals with analysing and adapting the work system to the worker, thus having a different approach to occupational risks. The article aims to clarify the highly needed collaboration between ergonomists and occupational health

professionals, with the noble objective of ensuring both workplace well-being and optimal performance of the work system.

In particular, ergonomic risks require a holistic approach, such as work-related musculoskeletal disorders (WRMSDs), which result from occupational exposure to ergonomic risks. The authors propose a general framework applicable to the conception of ergonomic interventions for the reduction of ergonomic risks that relies on the establishment of an interdisciplinary team of experts involved throughout the design and implementation of ergonomic interventions, including occupational health professionals.

Collaboration between occupational health professionals and ergonomists – brief literature review

An interesting approach is provided by Collatuzzo and Bofetta [1], where the P4 paradigm – where the four P stand for predictive, preventive, personalized, and participatory – is applied to occupational medicine [1]. Initially promoted by Hood [2], the paradigm consists of four milestones: (1) prediction of disease by early identification of symptoms or causal factors, (2) preventive actions derived from the initial prediction, (3) personalised approach to treatment and disorder management (depending on patient's individual characteristics), and (4) participatory character determined by individual's involvement in maintaining a good health status [2]. The main benefits of the P4 paradigm consist of a proactive approach, interest in early diagnosis and preventive measures, customization of treatment, focus on patient physical and mental well-being, and a data-driven approach [1]. Considering the afore-mentioned benefits, application of P4 paradigm to occupational medicine would enable health professionals to better assess workplace risks that affect worker's health and create the context for implementing proactive approaches to workplace risk management.

However, this would not be feasible if the whole process would fall into the responsibility of solely an occupational health professional, as they are dealing with a considerably high number of employees per year. In 2020, in Romania there were 801 occupational health professionals [3] addressing to a total occupied population of 8.5 million workers [4]. Only by looking at the ratio of workers per occupational health professional can one deduce that occupational health professionals need to collaborate with other specialists to implement the P4 paradigm. Interestingly enough, in Romania, occupational health professionals are the ones given by law with the responsibility of investigating various disorders and determining whether their cause is related to work [5]. This shifts the responsibilities of occupational health professionals from pure medical to more interdisciplinary requirements [6]. The logical question that arises from this observation is 'To what extent can an occupational health professional have a comprehensive approach to the work system without collaboration with an ergonomist?'. Answering this question may be difficult considering the current legal framework in Romania. However, it becomes clear that this collaboration would bilaterally compensate

for the potential lacks or defects that may appear in the exercise of each of the two professions.

The common point of occupational medicine and ergonomics is focusing on workers' health and wellbeing. The interconnection between the two fields is of common interest to ensure the health and well-being of workers. The occupational health professional has the right to recommend any necessary interventions to reduce workplace risks and health hazards in order to improve health conditions at work [6]. However, the occupational health professional reviews and assesses the working conditions of each employee from a medical perspective. The ergonomist, on the other hand, has the knowledge and ability to assess the workplace from multiple perspectives, providing a more broad and comprehensive approach, complementary to the medical perspective. However, the best-case scenario is one where the ergonomist and the occupational health professional collaborate for the design of ergonomic interventions, thus minimising potential flaws or downfalls.

Ergonomists analyze the workplace and design ergonomic interventions to optimize the work system [7]. Oftentimes, in their ergonomic interventions, ergonomists do not consider factors deriving from the personal life of the employees working at the workplaces under analysis. There are various reasons for this, the main ones being data privacy issues and irrelevance to the work system. But occupational health professionals do analyse potential factors from workers' private lives that can impact performance at work and workplace wellness [8]. Therefore, the collaboration between the two categories of professionals leads to a multifactorial analysis on the causality of various disorders. On the one hand, the occupational health professional provides an epidemiological perspective on the worker and, on the other hand, the ergonomist analyses and assesses all the elements of the working system [9].

Collaborative Approach to WMSDs

From a conceptual point of view, ergonomic risk can be defined as the risk of musculoskeletal disorders (MSDs) by overloading the musculo-osteo-articular system, respectively, through repetitive movements, physical overload or unnatural postures [10]. Naturally, movement is the central element in the execution of any human action. However, it becomes problematic when the movement is performed unnaturally or as a result of the action of external forces, generating acute responses translated into

fatigue, execution errors, pain, and symptoms specific to WMSDs [7]. Postural demands are the result of exposure to ergonomic risks [11], representing a significant problem on the job, regardless of the field of activity.

There is a general concern worldwide about the high prevalence of musculoskeletal disorders among workers, despite considerable efforts made to reduce their incidence and severity. Not only does the occupational health and safety legal framework imply protection of workers from ergonomic risks, but the principles of ergonomics ensure optimal working conditions, adapted to human particularities. On the other hand, occupational medicine professionals are the ones identifying and diagnosing WMSDs. Hence, there is an obvious gap between prevention and diagnose of MSDs, as in most cases occupational medicine professionals do not collaborate constantly with ergonomists. In particular, in Romania there is no legal requirement for the collaboration of ergonomists and occupational health professionals. Moreover, ergonomics as a profession is itself at an initial stage of development, leading to a general situation where ergonomists are few and are unable to address the high number of workplaces nationwide. The need for ergonomists is indubitable considering the worrying statistics that indicate high number of WMSDs across Romania and the EU.

In the workplace, postural demands are high, with a negative impact at the individual, organizational, and social level. In Romania, there is no general framework for the prevention of postural stress, this fact generating a vicious circle that drastically reduces the efficiency of ergonomic interventions.

The International Labor Organization draws attention to the fact that in 2021, worldwide, musculoskeletal disorders resulting from occupational exposure accounted for 13.7% of disability-adjusted life years [12]. At the level of the European Union (EU), the European Agency for Occupational Health and Safety has made constant efforts to increase awareness of the negative impact of postural demands at work, along with the promotion of good practices regarding ergonomics and occupational health and safety. The European Enterprise Survey on New and Emerging Risks (ESENER) demonstrated in its third edition that ergonomic risks continue to occupy leading positions in the classification of workplace risks [13]. Thus, repetitive movements of hands and arms, work in a sitting position and lifting/moving people or heavy masses are among the main occupational risks identified in EU enterprises [13]; moreover, working in a sitting position is the second

most frequent occupational risk, indicating the need to pay more attention to emerging risks in the field of ergonomic risks [14].

In Romania, a real challenge is generated by the lack of knowledge and awareness of the role of ergonomics in ensuring well-being at work. The slow evolution of ergonomics as a science and practice in the Romanian space contributed to this phenomenon [15]. Moreover, in Romania there are no legislative provisions to regulate the application of ergonomics in the design and organization of workplaces. However, the last decade has been marked by significant efforts towards the creation of a functional and professional framework in the field of ergonomics in Romania. Thus, in 2017, the profession of ergonomist was introduced in the Classification of Occupations in Romania (higher qualification, code 226309) through the Joint Order of the Ministry of Labor and Social Justice (MMJS) and the National Institute of Statistics (INS) no. 198/1938/2017 [17]. The natural continuation was the establishment in Timișoara, in 2019, of the Society for Ergonomics and Work Environment Management (acronym ErgoWork) and its inclusion in the European Federation of Ergonomics Societies (FEES) a year later [7].

A best practice in the field of interdisciplinary collaboration between ergonomists, occupational health professionals, architects, and other professionals is the development of the "Ergo@Home" guide for the ergonomic and efficient organization of the work space for telework and telestudy (to support the development of professional and educational activities during the COVID-19 pandemic and prevention of MSDs) [7]. The guide is the result of joint collaboration between members of ErgoWork and Romanian Society for Occupational Medicine, reflecting the successful outputs such types of collaborations can have.

The significant advances made in the last 5 years have created the fertile environment for the development of ergonomic intervention models that are versatile and easy to implement in organizations. Moreover, the rapid technological evolution led to the emergence of the concept of computer-aided ergonomics, a valuable application of computer-aided technologies in the field of ergonomics [18-20].

With respect to WMSDs, application of artificial intelligence in the service of ergonomic risks assessment (AI-based software tools) has proved to be efficient and to reveal relevant insights on key improvement areas [21].

The COVID-19 pandemic further generated undesired outcomes in terms of MSDs occurrence and

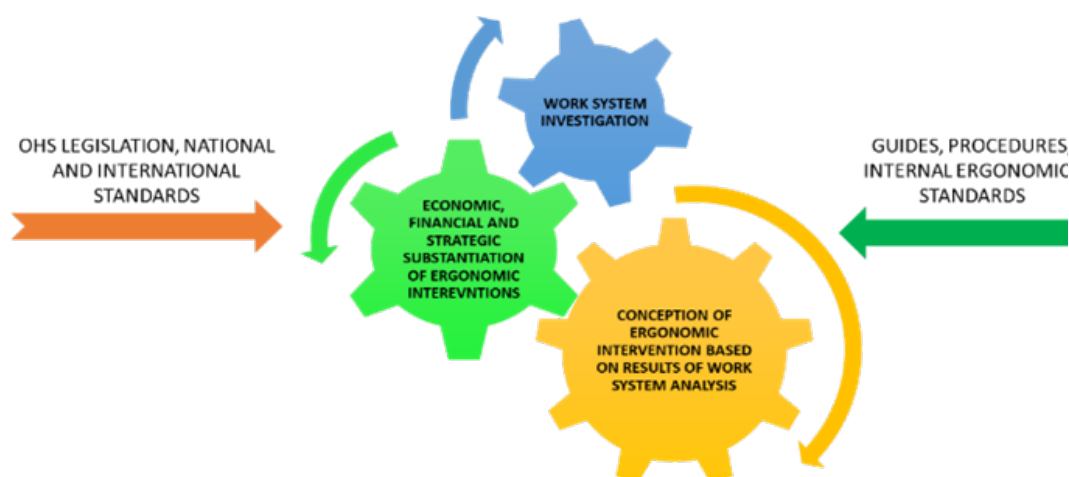
frequency of MSDs, especially for those in telework and telestudy [22, 23]. Participatory ergonomics, proactive approach to risks, and interdisciplinary teams of specialists are key elements of the renowned 'Total Worker Health' framework developed by the US National Institute for Occupational Health and Safety (NIOSH) [24]. This reinforces the pertinence of the approach proposed in this paper.

Figure 1 presents an ergonomic intervention model proposed by Boatca [7]. The model relies on a variety of data to be collected and analysed to understand the specifics of the work system and identify all downfalls and occupational risks that require ergonomic interventions. The core of this model is the establishment of an interdisciplinary team of professionals to permanently collaborate during the application of the whole framework [7]. Occupational health professionals are mandated to be part of the interdisciplinary teams designated for implementation of this framework, considering the

highly valuable insights they can provide as input and improvement proposals.

EU-OSHA reviewed available literature on prevention of WMSDs, revealing that ergonomics has a major role in development of solutions for minimization of WMSDs occurrence due to the systemic approach [25]. Other fields, including engineering and design, benefit from ergonomics knowledge, supporting the already-stated approach of collaboration between occupational health professionals and ergonomists [25]. The stringent need for a new methodology to solve an old problem arises from the multitude of scenarios and potential approaches that have already been proposed and have been shown to have limited efficiency [26]. Finally, both ergonomists and occupational health professionals address public health concerns by reducing or preventing the impact of different diseases, thus improving the health of the workplace and the quality of life of individuals [27].

Figure 1. Ergonomic intervention model proposed by Boatca [7]



Conclusion

The purpose of the paper is to provide the rationale for an improved approach to workplace wellness and occupational health and safety: collaboration and constant communication between ergonomists and occupational health professionals. Interesting enough, in 2000, the World Health Organization highlighted that occupational health is a broad field, where a variety of professionals can work, from physicians to ergonomists, IT specialists, and physiotherapists, among others [28]. The obvious need for multiple categories of specialists working together to achieve workplace wellbeing and occupational health seems

to pertain to common sense. However, the slow pace of development of ergonomics as a field of practice in Romania, combined with a relatively low number of occupational health physicians leads to an impossible situation where occupational health and safety are often limited to the minimal requirements imposed by law, while ergonomic interventions and development of internal best practices in companies are only a desideratum. In the end, all efforts should serve a common aim, building the case for reconsideration on the need of building occupational health teams and to shift companies approach to workplace risks from the reactive state to (at least) the proactive approach.

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