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## Analysis of the role of job stress in the presence of musculoskeletal symptoms, related with ergonomic factors

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### Abstract

Today, many studies have pointed to the role of both, ergonomic and psychosocial conditions in the development of various health problems in workers. One of the main problems encountered in the workplace is the musculoskeletal discomfort, which if not are removed can lead to cumulative trauma disorders. The theoretical evidence suggests that work organization can influence the development of these problems [1]. The aim of this paper is to present a comparative analysis of four studies, in which the presence of job stress with reports of musculoskeletal discomfort was related, additionally, the ergonomic conditions in the workplace where considered as a mediator factor. A cross-sectional study, comparative with 649 workers from four companies was conducted. The instruments used were: 1) Standardized Nordic Questionnaire on musculoskeletal symptoms of Kourinka; 2) The short version of the Job Content Questionnaire, with 27 items; and 3) List of ergonomic evaluation, in order to determine the risks to the upper and lower segments. In the four studies a relationship between the presence of job stress and reports of musculoskeletal symptoms was found. While a similar pattern on the strength of the relationship was not found, but variations in each group. These variations were influenced by gender and the ergonomic factors to which the subjects are exposed. The study results are consistent with findings of Lin, Chen and Lu [2], which indicate that females have a higher prevalence of skeletal muscle discomfort in all body areas compared to men. There is also consistency with the study by Solidaki, Chatzi, Bitsios, Markatzi, Plana, Castro, et al, [3], since in both subjects skeletal muscle discomfort in various body areas related to psychosocial factors was reported. We conclude that the design of jobs in industries not only generates musculoskeletal injury due to inadequate ergonomic conditions, but also influences the presence of stress among workers, which increases the presence of musculoskeletal symptoms.

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## 1. Introduction

It has been amply demonstrated that organizational factors in the workplace impact on the ergonomic demands, and simultaneously act as stressors at work. These conditions cause some stress-related disorders including musculoskeletal disorders [4].

There is scientific evidence that there are other factors that cause or increase the severity of symptoms and musculoskeletal problems. Coenen, Kingma, Boot, Twisk, Bongers & van Dieen [5] conducted an analysis of several epidemiological studies indicating that there is a division of risk factors: individual factors, physical work factors (ergonomics) and psychosocial factors (job stress, social support and job satisfaction, for example), which have helped to understand the low back pain, which is one of the musculoskeletal problems that cause more disability.

Among these psychosocial factors, job stress, has shown to have a greater association with musculoskeletal disorders, which has been studied in greater depth. To understand this relationship, is important to consider the role of work organization.

Carayon, Smith and Haims [1], point to two possible effects of work organization in generating risks. First, many organizational factors have been linked to stress reactions and second, the organization can influence ergonomic factors such as posture, repetition, and movements, which have been identified as risk factors for musculoskeletal disorders.

Work organization can define a) the nature, b) the force and c) time of exposure to ergonomic risk factors, determining how a job can be done by setting production levels and defining the structure of payment.

The aim of this paper is to present a comparative analysis of four studies, in which the presence of job stress with reports of musculoskeletal discomfort was related, additionally, the ergonomic conditions in the workplace where considered as a mediator factor.

## 2. Method

### 2.1. Participants

The study involved 646 workers of both genders. The sample was obtained at the convenience of four companies. The subjects worked in the production area. All participated voluntarily and were informed of the risks of participation.

### 2.2. Instruments

In the research three instruments were used:

- Standardized Nordic Questionnaire on musculoskeletal symptoms Kourinka [6] with the aim of determining the prevalence of musculoskeletal symptoms. The first part of it was used, which assesses nine body segments, showing if symptoms have occurred in the last seven days or the last twelve months. This questionnaire has been employed in different jobs.
- The short version of the Job Content Questionnaire, Karasek, [7] as adapted by Juarez-Garcia, which consists of 27 questions. The questionnaire includes five items concerning psychological demands and social support. Control at work consists of nine items for skills and authority in the decision. It consists of a Likert scale with four points, ranging from strongly disagree to strongly agree.
- List of ergonomic evaluation, in order to determine the risks to the upper and lower segments. This checklist provides a baseline for assessing risks and solve ergonomic problems that may arise in the workplace.

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