Psychosocial Factors in Work-Related Musculoskeletal Disorders

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PSYCHOSOCIAL RISK FACTORS
Definitions suggest that psychosocial factors depend on workers’ perceptions:

“Psychosocial factors at work describe how the work organization is perceived by workers and managers; work organization deals with the way in which work is structured and processed”.

NIOSH defines *psychosocial factors as a general* term that identifies many **variables** that can be roughly divided into three categories:

- factors associated with the work environment,
- factors associated with the extra-work environment,
- individual characteristics of the worker.
Work Environment
Psychosocial work environment risk factors include the following:

(1) characteristics of the job (e.g., workload, job control, repetition and monotonous tasks, mental and cognitive demands, clear job definitions),
(2) organizational structure (e.g., communication issues),
(3) interpersonal relationships at work (e.g., relationships with employer, supervisor, co-workers),
(4) temporal aspects of work (e.g., shift work, cycle time of tasks),
(5) financial and economic aspects (e.g., salary, benefits),
(6) community aspects of occupation (e.g., prestige, status)

Extra-Work Environment
These include psychosocial factors that relate to the worker’s other life-roles, such as responsibilities and function with the family.
Individual Worker Characteristics

Individual worker characteristics include the genetic factors (e.g., anthropometric characteristics, gender, intelligence), acquired aspects (e.g., social class, culture, educational factors), and disposition (e.g., personality, characteristic traits, attitudes toward life and work).

In contrast to NIOSH, the World Health Organization and ILO (international labor organization, in a joint report, organized work-related psychosocial factors into five categories:
- Physical environment;
- Factors intrinsic to the job (e.g., workload, work design);
- Arrangement of work time (e.g., hours of work, shifts);
- Management or operating practices (e.g., roles of the worker, relationships at work);
- Technologic changes.
NIOSH examined five psychosocial factors potentially related to WRMSDs (mainly in areas of the back and upper extremity disorders).

These variables are **job satisfaction, intensified workload, monotonous work, job control, and social support**.

NIOSH reports stronger support for the relationship between these psychosocial factors and WRMSDs in the back, neck, and shoulder area than in the hand and wrist area.

Studies examining these relationships are reviewed in predictors of increased back pain in heavy-industry workers. The variation in results may be a result of population differences.
1) **Intensified Workload:**
Intensified workload is most consistently associated with WRMSDs and is usually measured by perceived time pressure, workload and work pressure.

A study that *controlled for physical load* found an association between workload and *upper back and limb symptoms.* Others have found that increased workload (time pressure and greater time at a computer) was related to symptoms in the neck, shoulder, hand, and wrist.

Two types of work loads: *quantitative workload* (large amount of work, long hours, or haste at work) and *qualitative workload* (tasks too simple or too difficult).

Affect workers’ health negatively through different mechanisms.

1) **Quantitative workload** affects biomechanical factors and stress,
2) **Qualitative workload** affects mental overload and thus overall physical well-being.
2) Monotonous Work
Monotonous work is associated with neck symptoms and low back pain. Some theorize that the rate of detection of symptoms is higher in “less-interesting” jobs because boring work fails to distract attention from symptoms.

3) Job Control
Job control is frequently linked to musculoskeletal symptoms. e.g. that the introduction of computers caused a lack of control over specific aspects of work, reduction of task diversity, and increased isolation. These psychosocial factors were more important predictors of hand and wrist symptoms in newspaper departments with a high concentration of data-entry workers, compared with editorial workers (decision making and varied tasks).

It was reported that lower back symptoms are associated with lack of job control and due to extremely demanding work, whereas upper back symptoms appear to be associated with emotional and interpersonal factors.
Social Support
Social support from co-workers or supervisors has been studied showed that, poor social support is associated with increased reports of symptoms. Individuals who worked with WRMSDs from those who did not by noting that the individuals who did not work because of WRMSDs expressed more anger toward their employers (although both groups had a similar perception of the work environment).
It was reported that high physical demands combined with poor social support increased symptoms.

Decreases in co-worker cohesion correlated with higher pain ratings (but not with distress).
Other research supports the theory that decreased social support from co-workers and supervisors correlates with increased musculoskeletal symptoms in the upper extremities (neck and shoulder area, wrist and hand area) in a variety of occupations.
THEORIES EXPLAINING THE RELATIONSHIP BETWEEN PSYCHOSOCIAL FACTORS AND WORK-RELATED MUSCULOSKELETAL DISORDERS

Several theories attempt to explain the influence of psychosocial factors on the development of musculoskeletal symptoms. Most of these theories assume that psychosocial factors help cause symptoms, although some suggest other relationships.

1) One of the most popular explanations suggests that psychosocial factors increase muscle tension and exacerbate existing biomechanical strain on the musculoskeletal system through increased mental stress.

In one study, increased electromyographic activity was recorded from the muscles of the neck (trapezius) and the erectorspine muscles during mentally stressful activities.

Electromyographic activity increased with ergonomic loads and increased further when psychologic loads were added, which supports the theory of increased muscular tension resulting from mental stress.
2: Psychosocial factors directly influence mechanical loads through changes in posture caused by stress. For example, people tend to change posture when pressured by deadlines (e.g., hunched trunk, elevated shoulders).

In addition, stress originating from the combination of few variables, such as poor job control or poor social support joined with a poor capacity to cope, may increase muscle tone and, in the long run, lead to musculoskeletal disorders.

3: It was demonstrated that increased mental demands are associated with increased worry, fatigue, and difficulty sleeping.

These symptoms correspond with behavior that increases muscle tension, which is associated with back, shoulder, and neck discomfort.
Ecologic model describing a pathway leading from work organization to musculoskeletal outcome in office workers.

The pathways included in this model are based on research with a specific population (computer workers).

1: The model identifies a **direct path between work technology** (tools and work system) and **both physical demands** (including ergonomics) and **work organization**.

A direct path also exists between physical demands and work organization, suggesting that physical demands are exacerbated by organizational demands (i.e., increased job specification increases repetition).
Another path identified in the model exists between work organization and psychosocial strain (i.e., stress). This path is suggested to affect musculoskeletal outcomes in two ways.

First, stress increases muscle tension and autonomic processes and adds to the biomechanical strain that already exists.

Second, cognitive processes mediate the relationship between biomechanical strain and musculoskeletal symptoms (i.e., the process of detecting and interpreting symptoms can further influence stress at work). Stress-related arousal may increase sensitivity to normal musculoskeletal sensation; the worker becomes aware of any small sensation that in other situations would be suppressed.

Workers involved in stressful work conditions may also attribute normal musculoskeletal sensation to work conditions and believe such sensations to be a sign of injury and illness.
The demand-control-support model provides another view for identifying the relationship between psychosocial factors and WRMSDs and is a widely accepted model for work-related stress.

According to this model, psychologic demands have adverse affects on a worker if they occur jointly with low decision latitude.

Low decision latitude is identified by the absence of authority to decide what to do and how to do it and by the lack of intellectual discretion (i.e., the opportunity to use and develop skills at work).

The social support component in this model is the support available in the workplace that is thought to mediate between the demands and the appearance of symptoms.

Research on this model supports the assumption that these components are relevant to the development of musculoskeletal disorders.
METHODOLOGIC PROBLEMS

Interpretation of the research is complicated by the different designs used, populations studied, and type of psychosocial factors and WRMSDs examined.

Most of the research examining the relationships between psychosocial risk factors and WRMSDs use cross-sectional designs, making causality impossible to determine.

Few studies have considered the confounding effect of physical stressors (static load and repetitive work) when assessing the relationships between psychosocial risk factors and WRMSDs. An exception is the study by Theorell and colleagues, who did control for physical stressors when assessing factors such as social support.

NIOSH notes that changes in physical and biomechanical demands occur simultaneously with changes in psychosocial demands, making it difficult to determine the causal relationships between them. Another problem arises from the tools used to measure psychosocial factors, Difficult to measure with objective measurements and are usually subjective assessed through surveys or self-report techniques.
Cognitive theorists suggest that the individual is a filter through which the environment is observed; Lazarus emphasizes the cognitive and affective functions of the individual identifying work demands. Thus determining whether risk factors are colored by one’s perception or are reflective of the “true” situation is difficult.

Sauter and Swanson suggested ways to improve research by (1) developing longitudinal studies, (2) improving the tools used to assess health and psychosocial factors, (3) improving analytic methods to separate the effects of the psychosocial factors, (4) examining the suggested pathways and explaining the relationships.
ASSESSMENT:
THE OCCUPATIONAL STRESS INVENTORY
The occupational stress inventory (OSI) was designed to measure occupational stressors and to provide measures for the theoretical model linking work-related stress with the psychological strains experienced by the worker.

It also aims at identifying coping resources available to the worker to deal with the stressors and the psychologic strain.

The OSI measures three dimensions in occupational adjustment:

- occupational stress,
- psychologic strain,
- coping resources.
Occupational Stress
Occupational stress is measured with **six scales of the occupational roles questionnaire** that include

1. **Role overload** *(how much job demands exceed resources and whether the worker can accomplish the expected workloads)*
2. **Role insufficiency** *(appropriateness of the worker’s training, education, skills, and experience to job requirements)*;
3. **Role ambiguity** *(the level of the worker’s understanding of the expectations and evaluation criteria)*;
4. **Role boundary** *(the extent to which the worker experiences conflicts in role demands or loyalties)*;
5. **Responsibility** *(the amount of responsibility perceived by or given to the worker to ensure the performance and welfare of others on the job)*;
6. **Physical environment** *(the frequency with which the worker is exposed to extreme conditions [e.g., high levels of environmental toxins])*.
Coping Resources
Coping resources are measured with **four scales** of the personal resources questionnaire that include

1. **Recreation** (*pleasure and relaxation derived from regular recreational activities)*;

2. **Self-care** (*the frequency with which the worker engages in personal activities that reduce or alleviate chronic stress)*;

3. **Social support** (*the extent to which the individual feels support and help from those around him or her)*;

4. **Rational and cognitive coping** (*how frequently the individual uses cognitive skills to deal with work-related stress)*.
INTERVENTIONS
The nature of the psychosocial risk factors and their distribution among workers may suggest the direction and level of intervention (i.e., individual or organizational).

**Three levels of intervention are used to improve the work environment:**

1. Prevention that aims at reduction in work constraints;
2. Prevention that aims to increase individuals’ ability to cope with stress and change;
3. Individual rehabilitation of employees who have already shown consequences of occupational stress.

It has been suggested that intervening at the first level of prevention is the most efficient.

Himmelstein and colleagues suggested that early intervention to prevent work disability focusing on reducing employer-employee conflicts, improving medical management of pain, and enhancing the ability to cope with residual pain and distress and avoiding unnecessary surgery.
Lindstrom describes a **research-based model for creating a good work organization** based on psychosocial intervention.

- The need to optimize quantitative workload and qualitative workload is emphasized,
- The level of autonomy and freedom at work is maximized because they are thought to decrease stress and hence musculoskeletal symptoms.
- Improving **interpersonal relationships** among workers and improving communication between employees and supervisors is encouraged.
- **Coping skills are improved either through mental exercises or increased mastery of work.**

- The organization of the entire workplace is evaluated and altered by occupational health professionals.
- Workers at risk are provided with support and skills to deal with the work demands **through** group workshops, new skills-development workshops, and individual support from occupational psychologists.
Other intervention programs use cognitive behavioral methods, such as relaxation and cognitive restructuring, to provide the worker with coping skills.

Cognitive strategies include focusing on the source of the stress and adopting alternative methods for addressing problems. Cognitive-behavioral strategies also help improve pain management by altering cognitive, behavioral, and affective responses.

The techniques used include relaxation (including using biofeedback), activity pacing, cognitive restructuring, and imagery and distraction to deal with pain.

These techniques require a clinical psychologist who is able to assess and treat within the framework of cognitive-behavioral therapy.
Based on combined models of Karasek and Siegrist used a **five-step program** in which the organization and employees were active participants.

- **Step 1** was getting the organization to commit.
- **Step 2** was identifying job constraints by using evaluation forms used in the two models and grouping them into known psychosocial factors (the most frequent identified factors were workload and social support).
- **Step 3** involved developing action plans to improve work environment in the areas that were identified as stressful.
- **Step 4** involved implementation of the action plans.
- **Step 5** involved evaluation of the action plans’ success and follow-up.

The importance of this study lies first in its theoretic framework (basing the assessment and implementation on known models) and second in the process itself—mainly the involvement of the employees and management in the program and including a follow-up to assess long-term effect.
Thanks