



Work-related stress risk factors and health outcomes in public sector employees



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ABSTRACT

Introduction: Work-related stress is one of the major concerns for occupational safety and health. Indeed, workplace stress may affect workers' well-being and lead to health issues, and it has been estimated that about half of all work absence is due to work-related stress disorders. The objective of this study is to investigate associations between work-related stress risk factors and a set of health outcomes, in a sample of public sector employees.

Material and methods: Employees (N = 779) filled in a self-report questionnaire on work-related stress, musculoskeletal pain and stress-related disorders. Logistic regressions were conducted, with pain and disorders as outcome variables and the Health and Safety Executive Management Standards Indicator Tool (HSE-MS IT) scales as predictors.

Results: Excessive workload was associated with neck pain, shoulder pain and anxiety-depression symptoms. Employees exposed to risk on the role dimension reported higher neck pain and more gastrointestinal disorders. Hostile working relationships were associated with shoulder pain and gastrointestinal disorders, and lack of managers' support turned out to be a risk factor for insomnia.

Conclusions: Workplace stress plays a role in the incidence of specific health outcomes. Through the use of validated work-related stress assessment instruments, such as the HSE-MS IT, management can identify the critical intervention targets in work design domains for improving workers' health and well-being.

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1. Introduction

Work-related stress is one of the major concerns for occupational safety and health. According to the EU-OSHA 2013 poll, more than half of workers in the European Union report stress as a common issue, and more than forty percent of workers believe that stress is not appropriately handled in their workplace (European Agency for Safety and Health at Work). Several other European surveys indicate that workers frequently report work-related stress as a cause of ill health, with stress and stress-related diseases being second only to musculoskeletal disorders as a cause of health problems in the workplace (Cox et al., 2000a; European Foundation for

the Improvement of Living and Working Conditions, 2007; Milczarek et al., 2009). Indeed, evidence has accumulated that uncomfortable working conditions may affect workers' well-being and increase their anxiety-depression symptoms. These include insomnia and health disorders linked to hypothalamic-pituitary-adrenal axis activation, i.e., hypertension, cardiovascular disease, gastritis and peptic ulcer disease, and irritable bowel syndrome (European Foundation for the Improvement of Living and Working Conditions, 2007; Belkic et al., 2004; Eller et al., 2009; Kivimäki et al., 2006). In recent years, increasing attention has been paid to the relationship between stress, musculoskeletal symptoms (Ariëns et al., 2001; Macfarlane et al., 2009; Hartvigsen et al., 2004) and depression of the immune system (Cox et al., 2000a). Stress-related disorders are so common that they are estimated to cause half of all work absences. Work-related stress can also lead to higher rates of accidents, employee turnover and presenteeism. As a result, work-related stress is detrimental to organizational health and productivity as well

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(Cooper et al., 1996; Elkin and Rosch, 1990; Kearns, 1986) and a high priority issue is therefore identifying work-related stress sources and finding effective ways to manage them.

According to the UK Health and Safety Executive (HSE) Management Standards (MS) approach, stress depends on seven work design domains: Demands, Control, Managers' support, Peer support, Relationships, Role, and Change (Cox et al., 2000b; Cousins et al., 2004; Health & Safety Executive, 2007). In agreement with this approach, HSE has developed the Indicator Tool (HSE-MS IT), a questionnaire aimed at assessing each of the seven work-related stress risk factors. Some studies have already demonstrated the psychometric properties of the Indicator Tool, and how each HSE-MS IT scale is sensitive to different work-related stress psychological outcomes, such as job satisfaction, job motivation, and job-related anxiety and depression (Kerr et al., 2009; Bartram et al., 2009; Guidi et al., 2012; Marcatto et al., 2014).

To our knowledge, little is known about the relationships between the HSE Management Standards and health disorders. In fact, most studies have investigated work-related stress and health outcomes by using questionnaires based on two alternative job stress models, the Demand/Control Model (Karasek, 1979) and the Effort-Reward Imbalance Model (Siegrist, 1996), finding, however, different associations and only a small overlap between the two models (Bosma et al., 1998). Therefore, the present study was carried out with the aim of exploring the relationships between the seven HSE-MS IT dimensions and a set of health outcomes that have been associated in literature with stressful situations, in a sample of public sector employees. In accord with the previous findings about the psychological outcomes, we hypothesized that the HSE-MS IT scales are also sensitive to different work-related health outcomes, that is, we expected high risk levels in different work design domains to be specifically associated with different health conditions.

2. Methods

2.1. Participants and procedure

The participants were employees working in different sectors (civil registry, local police, market surveillance, culture and sport, education and social services) in a municipality in Italy. We applied a non-proportional stratified random sampling, and our resulting eligible sample for the present study was of 779 employees out of a population of 1681 public workers, with a sampling rate of 20% from local police and of 50% from other sectors. Participants were recruited at the beginning of a refresher course about safety. They were informed that this study was part of the mandatory work-related stress assessment required by the Italian law, it was approved by their trade unions, and that all measurement instruments were anonymous and only aggregated data would be fed back to the municipality. In all, 760 valid questionnaires were collected (97.6%). The majority of respondents were female (78%) and had a permanent job contract (83%). The age distribution was as follows: 3% were 18–29 years old, 16% were 30–39 years old, 40% were 40–49 years old, 38% were 50–59 years old, and 3% were older than 59.

2.2. Measures

Participants were asked to fill out two questionnaires, anonymously, in a self-report format: (i) the Italian version of the HSE-MS Indicator Tool (Marcatto et al., 2011), (ii) a questionnaire that measured musculoskeletal pain and assessed the presence of other disorders that have been associated with exposure to stressful situations. Participants were asked to provide some basic

demographic information as well, useful to describe the sample. The questionnaire also included other psychosocial variables, which we analyzed in a previous paper (Marcatto et al., 2014).

The HSE-MS Indicator Tool is a 35-item questionnaire aimed at assessing psychosocial variables relevant to evaluating exposure to stress factors, according to the Management Standards developed in the United Kingdom by the Health and Safety Executive (MacKay et al., 2004). HSE-MS IT takes into account a six-month time window prior to measurement and is composed of seven scales: Demands (8 items), Control (6 items), Managers' support (5 items), Peer support (4 items), Relationships (4 items), Role (5 items), and Change (3 items). Higher scores on the HSE-MS IT scales indicate a lower stress risk. For the present sample, Cronbach's Alphas for the seven scales ranged from 0.66 (Control) to 0.89 (Peer support), and they were comparable to alpha values observed in previous studies (Marcatto et al., 2011).

The self-report health assessment questionnaire was divided into three sections. In the first section, participants were asked to report musculoskeletal pain experienced in the last month in four areas of the body (neck, shoulders, upper back, and lower back) using the 11-point Numeric Pain Rating Scale (0 = *no pain*, 10 = *severe pain*; McCaffery and Pasero, 1999).

In the second section, participants were asked whether they suffered from hypertension, insomnia, anxiety-depression symptoms, and gastrointestinal disorders (*yes/no*). This kind of self-report anamnestic questionnaire is widely used in the literature.

Finally, participants were asked for their weight and height for Body Mass Index (BMI) calculation.

2.3. Data analysis

Mean scores and standard deviations were first calculated for each of the seven HSE-MS IT scales, and compared with Italian benchmark data (Rondinone et al., 2012). Descriptive statistics were also provided regarding workers' health assessment. Next, in order to assess associations between HSE-MS IT scales, musculoskeletal pain, and other health outcomes, we conducted hierarchical logistic regressions; with pain and health complaints as outcome variables and the HSE-MS IT scales as predictors, after controlling for gender, age group, and BMI. We dichotomized pain scores so as to distinguish between employees who referred zero to moderate pain levels (0–6 recoded into 0) from those who referred severe pain levels (7–10 recoded into 1), as is usually done with the Numeric Pain Rating Scale (McCaffery and Pasero, 1999). As to HSE-MS IT, we dichotomized scores in accordance with benchmark data: Scores below the 20th percentile reflect a high stress risk and were coded as 1, the remaining scores were coded as 0. This way, Odds Ratio (OR) and their respective 95% Confidence Intervals (95% CI) were observed for pain, health outcomes and job factors, adjusting for the effects of gender, age, and BMI.

3. Results

Table 1 presents descriptive statistics observed for the HSE-MS IT scales in our sample. Compared to the Italian benchmark data, the average scores were above the 50th percentile for the peer support scale only (with a result labeled as "*Good, but need for improvement*"), while all other scales were between the 20th and the 50th percentile (with a result labeled as "*Clear need for improvement*").

Musculoskeletal pain assessment and disorder incidence are reported in Tables 2 and 3, respectively. Average pain scores were lower than the mid-point of the numeric rating scale, with the lower back area being the more painful area ($M = 4.63$, $DS = 3.22$), with 27.4 per cent of employees reporting high pain

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