

# Work-related stress: evaluation in two working populations

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## Abstract

**Introduction:** in the assessment of work-related stress it is crucial to find the factors that generate and increase it in order to identify categories of individuals at risk, to plan interventions for prevention, elimination or reduction of risk. The aim of the study is to assess the subjective stress in 68 workers of a large Italian company dealing with human health, through the use of the questionnaire-indicating tool, developed by the Health and Safety Executive.

**Materials and methods:** we studied a final sample of 68 individuals [34 drivers/rescuers and 34 video display unit (VDU) operators]. The questionnaire consists of 35 items (divided into six areas) with five possible answers that covers working conditions considered potential causes of stress.

**Results:** the drivers/rescuers had a better performance than the VDU operators, especially in the areas "demand", "relationships" and "role". We compared men and women in the two groups, finding that, in VDU operators, women had a better performance than men in all areas, except "role" and

"changes", in which the overall scores were the same in men and women. In the drivers/rescuers women showed more critical scores in the items "relationships" and "change".

**Discussion:** the results show that additional future efforts should focus on understanding the psychosocial, organizational and individual problems related to stress and the consequent implementation of preventive measures.

**KEY WORDS:** health workers, questionnaire, psychophysical health, VDU operators, work-related stress.

## Introduction

Many studies have been carried out to identify the role of stress in many areas. The work area is certainly the most tested one because of the important correlation between occupational stress and individual response especially in terms of loss in productivity, increased risk of injuries, psychosomatic disorders and increased consumption of alcohol and cigarettes (1).

So the employer, with the responsible for the protection and prevention service and in cooperation with the occupational physician, has to assess any risk for the safety and the health of workers, including those related to work-related stress (Leg. Decree 81/08 as amended) according to the Europe Agreement of October 8, 2004.

In the assessment of work-related stress it is crucial to find the factors that generate and increase it in order to identify categories of individuals particularly at risk, and to plan interventions for prevention, elimination or reduction of risk.

Searching the literature it was found that the main sources of stress in the workplace for drivers/rescuers and for VDU operators are:

- psychological pressure from superiors, patients and family members (2)
- work overload (3-6)
- long working hours (3, 4)
- uncooperative and/or difficult patients (7, 8)
- night work (9, 10)
- perceiving the presence of a risk to himself in the workplace (11)
- having little free time to devote to activities outside of work (5-12)
- having poor support from colleagues (13)
- having a few days off (9)
- undergoing organizational constraints (14)
- submitting to a hierarchical scale (greater stress in

- leader operators and in the young and inexperienced workers) (15)
- having to give bad news to patients and having to deal with their suffering (16, 17)
- having little social support (6)
- having little decision-making authority (18)
- having scarcity of economic resources in the working structure of the profession (19).

The risk of work-related stress has to be evaluated because it can lead, long-term, to negative effects that can affect not only the health of workers, but also the satisfaction of those who use the service and the profit or the turnover of the company (20).

An analysis of the literature on this subject showed that several tools can be used for the assessment of work-related stress: physiological and biological indicators, epidemiological indicators, and objective and subjective assessments of stress.

The subjective evaluation of stress is performed mainly through the use of questionnaires.

The questionnaires are used to investigate the existence of sources of stress, to identify the potential risk factors, to evaluate the organization of work, and to identify protective factors or at least factors that can reduce stress. There are also questionnaires for the assessment and measurement of the pathogenic effects of stress in the emotional, cognitive, behavioral and psychosomatic fields.

The purpose of this study is to assess subjective stress through the use of a 35 item questionnaire-indicating tool HSE in 68 subjects (34 drivers/rescuers and 34 VDU operators) belonging to a large Italian company dealing with human health. The aim is to highlight, from the results of this survey, any working factor that, being a major cause of stress for workers depending on the specific task, requires the application of corrective measures. In addition, the analysis of the results may help in the future to implement organizational strategies aimed at preventing the onset of the conditions that workers perceive as more stressful.

## Material and methods

The method was a dimensional assessment of the subjective components of stress through the use of a questionnaire-indicating tool, proposed by the INAIL and developed by the HSE.

It is a questionnaire for easy administration and with guarantee of anonymity, usable in all companies with more than 10 workers, consistent with the indications for the evaluation of work-related stress expressed in the circular 18/11/2010 of the Ministry of Labor and Social Policy (referring to Legislative Decree no. 81/2008, as amended), as it provides results for groups of workers, not only for individual workers (Tab. 1).

We studied two groups of workers in the examined company: drivers/rescuers and VDU operators. The subjects studied were selected from the workers visited during the period between June 2013 and June 2014 for the health surveillance. Starting from the 87 total workers visited, we proceeded to compare the

drivers/rescuers and the VDU operators in terms of age and gender, selecting only the subjects comparable for those factors (a driver/rescuer for each VDU operator). The final sample was composed of 34 drivers/helpers and 34 VDU operators comparable for sex and gender.

Twenty-seven men aged between 30 and 50 years (mean: 44.29; SD: 6.00) and seven women aged between 30 and 50 years (mean: 45.42; SD: 7.91) were included in the category of drivers/rescuers; twenty-seven men aged between 35 and 50 years (mean: 45.81; SD: 4.02) and seven women aged between 42 and 50 years (mean: 46.71; SD: 3.30) were included in the category of VDU operators.

The VDU operator works, as an employee or self-employed, habitually using equipment with a display screen, including laptops, for at least 20 hours per week, discounting the breaks of 15 minutes every two hours.

A driver/rescuer is a worker who, following the certificate of qualification achieved in accordance with article 9, is authorized to carry out the following activities: operating health rescue vehicles equipped with warning alarm sound and a bright blue flashing light; preserving the safety of the occupants of those vehicles; keeping the efficiency and safety of the rescue vehicle; collaborating in the intervention of medical aid in the various stages of its development with particular regard to the safety of the venue (Art.1 15th Legislature - Bill No. 503). All subjects in the present study have been working for five days a week, for a total of 36 hours a week. The questionnaire was administered by the occupational physician during medical surveillance visits and it was preceded by the filling out of a short survey form with socio-demographic data.

It consists of 35 items, regarding working conditions considered potential causes of work-related stress, corresponding to six risk factors or organizational dimensions defined by the model management standards. For each of the 35 questions, five possible answers are provided: never, rarely, sometimes, often, always.

The five possible responses are divided and evaluated in numerical form on a Likert scale ranging from 1 (never) to 5 (always).

The model of management standards describes the six key organizational dimensions, which include:

- 1) Demand: includes components such as workload, work organization and work environment.
- 2) Control: evaluates the autonomy of the workers on how to conduct their work.
- 3) Support (divided into two subscales: "support from managers" and "support among colleagues"): evaluates the encouragement, support and resources provided by the company, the employer and the colleagues.
- 4) Relationships: includes the promotion of a positive work to prevent conflicts and address unacceptable behavior.
- 5) Role: verifies the awareness of workers about their position in the organization and it ensures that there are no conflicts.
- 6) Change: assesses how much the organizational

**Table 1 - Questionnaire-indicating instrument.**

|    |  |                                     |                                      |   |                                     |                                      |
|----|--|-------------------------------------|--------------------------------------|---|-------------------------------------|--------------------------------------|
| 1  | I am clear what is expected of me at work                                    | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 2  | I can decide when to take a break  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 3  | Different groups at work demand things from me that are hard to combine      | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 4  | I know how to go about getting my job done                                   | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 5  | I am subject to personal harassment in the form of unkind words or behaviour | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 6  | I have unachievable deadlines  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 7  | If work gets difficult, my colleagues will help me                           | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 8  | I am given supportive feedback on the work I do                              | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 9  | I have to work very intensively  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 10 | I have a say in my own work speed  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 11 | I am clear what my duties and responsibilities are                           | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 12 | I have to neglect some tasks because I have too much to do                   | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 13 | I am clear about the goals and objectives for my department                  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 14 | There is friction or anger between colleagues                                | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 15 | I have a choice in deciding how I do my work                                 | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 16 | I am unable to take sufficient breaks  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 17 | I understand how my work fits into the overall aim of the organisation       | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 18 | I am pressured to work long hours  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 19 | I have a choice in deciding what I do at work                                | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 20 | I have to work very fast   | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 21 | I am subject to bullying at work   | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 22 | I have unrealistic time pressures  | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |
| 23 | I can rely on my line manager to help me out with a work problem             | Never<br><input type="checkbox"/> 1 | Seldom<br><input type="checkbox"/> 2 | Sometimes<br><input type="checkbox"/> 3 | Often<br><input type="checkbox"/> 4 | Always<br><input type="checkbox"/> 5 |

(to be continued)

**Table 1 - (cont).**

|    |   |                          |                 |                |              |                       |
|----|---|--------------------------|-----------------|----------------|--------------|-----------------------|
| 24 | I get help and support I need from colleagues   | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 25 | I have some say over the way I work   | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 26 | I have sufficient opportunities to question managers about change at work             | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 27 | I receive the respect at work I deserve from my colleagues                            | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 28 | Staff are always consulted about change at work                                       | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 29 | I can talk to my line manager about something that has upset or annoyed me about work | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 30 | My working time can be flexible   | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 31 | My colleagues are willing to listen to my work-related problems                       | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 32 | When changes are made at work, I am clear how they will work out in practice          | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 33 | I am supported through emotionally demanding work                                     | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 34 | Relationships at work are strained  | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |
| 35 | My line manager encourages me at work   | Strongly disagree<br>□ 1 | Disagree<br>□ 2 | Neutral<br>□ 3 | Agree<br>□ 4 | Strongly agree<br>□ 5 |

changes, of any size, are managed and communicated within the company.

The subdivision of the questions in fields is the following:

- 1) Load (demand) of work: nos. 3, 6, 9, 12, 16, 18, 20, 22
- 2) Control (decision-making autonomy): nos. 2, 10, 15, 19, 25, 30
- 3) Support from managers: nos. 8, 23, 29, 33, 35
- 4) Support from colleagues: nos. 7, 24, 27, 31
- 5) Quality of relationships: nos. 5, 14, 21, 34
- 6) Definition of the role: nos. 1, 4, 11, 13, 17
- 7) Changes: nos. 26, 28, 32.

The questionnaire investigates the subjective perception of stress by the worker in the last six months of service.

### Data Analysis

The data obtained from the questionnaire were analyzed, using special software that allows the comparison with the reference population. It produces a table describing each of the six dimensions with a numerical value and its color reference (color code).

Red indicates a serious situation that requires immediate corrective action, and whose values are below the 20<sup>th</sup> percentile.

Yellow indicates a clear necessity for corrective action, with values below the average but above the 20<sup>th</sup> percentile.

Light blue indicates the presence of a good level of performance; however, it requires interventions, with a score between the 50<sup>th</sup> and 80<sup>th</sup> percentiles.

Green indicates an optimal situation with satisfaction of the management standard with a score greater than the 80<sup>th</sup> percentile and that must be maintained over time. For each working population, both sexes were considered together and separately.

All subjects agreed with the processing of their personal data, stating their awareness of the presence of sensitive data and they agreed to treat the data obtained by the protocol in an anonymous and collective way, through scientific procedures, according to the principles of the Helsinki Declaration.

## Results

68 questionnaires were filled in, all suitable for inclusion in the data analysis, with a response rate of 100%.

## Total results according to job duty

In the drivers/rescuers population the ideal standard (green area) is achieved for the fields "Demand", "Support from colleagues" and "Relationships"; the field "Control" is the most far away from the standard (red area); "Support from managers", "Role" and "Change" are near to standards without reaching them (score between the 50<sup>th</sup> and the 80<sup>th</sup> percentile, blue area) (Tab. 2).

In the VDU operators' population, the ideal conditions are achieved only for the field "change" (score greater than 80<sup>th</sup> percentile); the fields "Control", "Support from managers" and "Support from colleagues" fall in the blue area; the fields "Demand", "Relationships" and "Role" are critical, falling in the red area (Tab. 3).

**Table 2 - Scores in the drivers/rescuers group.**

| EXAMINED FIELD IN DRIVERS/RESCUERS |   | Total<br>N =34    | Men<br>N=27       | Women<br>N =7     |
|------------------------------------|---|-------------------|-------------------|-------------------|
| <i>DEMAND</i>                      |   |                   |                   |                   |
| 3                                  | Different groups at work demand things from me that are hard to combine               | 3,74 <sup>a</sup> | 3,85 <sup>a</sup> | 3,57 <sup>a</sup> |
| 6                                  | I have unachievable deadlines   | 4,17 <sup>a</sup> | 4,63 <sup>a</sup> | 4,14 <sup>a</sup> |
| 9                                  | I have to work very intensively   | 2,24 <sup>c</sup> | 2,26 <sup>c</sup> | 1,86 <sup>d</sup> |
| 12                                 | I have to neglect some tasks because I have too much to do                            | 3,88 <sup>a</sup> | 4,07 <sup>a</sup> | 4,00 <sup>a</sup> |
| 16                                 | I am unable to take sufficient breaks   | 3,29 <sup>c</sup> | 3,44 <sup>b</sup> | 3,14 <sup>c</sup> |
| 18                                 | I am pressured to work long hours   | 3,88 <sup>b</sup> | 3,89 <sup>b</sup> | 4,14 <sup>a</sup> |
| 20                                 | I have to work very fast  | 2,91 <sup>a</sup> | 2,70 <sup>b</sup> | 2,43 <sup>d</sup> |
| 22                                 | I have unrealistic time pressures   | 4,24 <sup>a</sup> | 4,56 <sup>a</sup> | 4,43 <sup>a</sup> |
|                                    | Total   | 3,53 <sup>a</sup> | 3,68 <sup>a</sup> | 3,46 <sup>a</sup> |
| <i>CONTROL</i>                     |   |                   |                   |                   |
| 2                                  | I can decide when to take a break   | 2,61 <sup>d</sup> | 2,70 <sup>d</sup> | 2,14 <sup>d</sup> |
| 10                                 | I have a say in my own work speed   | 3,29 <sup>c</sup> | 3,41 <sup>b</sup> | 2,86 <sup>d</sup> |
| 15                                 | I have a choice in deciding how I do my work  | 2,82 <sup>d</sup> | 2,85 <sup>d</sup> | 3,43 <sup>c</sup> |
| 19                                 | I have a choice in deciding what I do at work   | 2,79 <sup>c</sup> | 2,89 <sup>c</sup> | 2,00 <sup>d</sup> |
| 25                                 | I have some say over the way I work   | 3,62 <sup>c</sup> | 3,67 <sup>c</sup> | 3,86 <sup>b</sup> |
| 30                                 | My working time can be flexible   | 2,94 <sup>c</sup> | 2,89 <sup>d</sup> | 2,43 <sup>d</sup> |
|                                    | Total   | 3,01 <sup>d</sup> | 3,07 <sup>d</sup> | 2,79 <sup>d</sup> |
| <i>SUPPORT FROM MANAGER</i>        |   |                   |                   |                   |
| 8                                  | I am given supportive feedback on the work I do                                       | 3,82 <sup>a</sup> | 3,63 <sup>a</sup> | 3,86 <sup>a</sup> |
| 23                                 | I can rely on my line manager to help me out with a work problem                      | 3,82 <sup>b</sup> | 3,74 <sup>b</sup> | 3,71 <sup>c</sup> |
| 29                                 | I can talk to my line manager about something that has upset or annoyed me about work | 3,58 <sup>d</sup> | 3,52 <sup>d</sup> | 3,14 <sup>d</sup> |
| 33                                 | I am supported through emotionally demanding work                                     | 3,68 <sup>a</sup> | 3,59 <sup>a</sup> | 4,29 <sup>a</sup> |
| 35                                 | My line manager encourages me at work   | 3,00 <sup>d</sup> | 2,78 <sup>d</sup> | 3,29 <sup>d</sup> |
|                                    | Total   | 3,58 <sup>b</sup> | 3,45 <sup>c</sup> | 3,66 <sup>a</sup> |
| <i>SUPPORT FROM COLLEAGUES</i>     |   |                   |                   |                   |
| 7                                  | If work gets difficult, my colleagues will help me                                    | 4,35 <sup>a</sup> | 4,30 <sup>a</sup> | 4,86 <sup>a</sup> |
| 24                                 | I get help and support I need from colleagues   | 4,09 <sup>a</sup> | 4,30 <sup>a</sup> | 4,71 <sup>a</sup> |
| 27                                 | I receive the respect at work I deserve from my colleagues                            | 4,24 <sup>a</sup> | 4,56 <sup>a</sup> | 4,71 <sup>a</sup> |
| 31                                 | My colleagues are willing to listen to my work-related problems                       | 4,12 <sup>a</sup> | 4,19 <sup>a</sup> | 4,43 <sup>a</sup> |
|                                    | Total   | 4,20 <sup>a</sup> | 4,33 <sup>a</sup> | 4,68 <sup>a</sup> |

(to be continued)

Table 2 - (cont.).

| <i>RELATIONSHIPS</i>   |  |                   |                   |                   |
|--|--|-------------------|-------------------|-------------------|
| 5  | I am subject to personal harassment in the form of unkind words or behaviour | 4,62 <sup>a</sup> | 4,85 <sup>a</sup> | 3,86 <sup>d</sup> |
| 14   | There is friction or anger between colleagues                                | 3,82 <sup>a</sup> | 3,96 <sup>a</sup> | 3,86 <sup>a</sup> |
| 21   | I am subject to bullying at work   | 4,65 <sup>b</sup> | 4,70 <sup>a</sup> | 4,29 <sup>d</sup> |
| 34   | Relationships at work are strained   | 3,94 <sup>a</sup> | 3,96 <sup>a</sup> | 4,00 <sup>a</sup> |
|  | Total  | 4,26 <sup>a</sup> | 4,37 <sup>a</sup> | 4,00 <sup>b</sup> |
| <i>ROLE</i>  |  |                   |                   |                   |
| 1  | I am clear what is expected of me at work                                    | 4,55 <sup>a</sup> | 4,48 <sup>a</sup> | 4,86 <sup>a</sup> |
| 4  | I know how to go about getting my job done                                   | 4,71 <sup>a</sup> | 4,81 <sup>a</sup> | 4,86 <sup>a</sup> |
| 11   | I am clear what my duties and responsibilities are                           | 4,59 <sup>a</sup> | 4,78 <sup>a</sup> | 5,00 <sup>a</sup> |
| 13   | I am clear about the goals and objectives for my department                  | 3,88 <sup>c</sup> | 3,81 <sup>d</sup> | 4,71 <sup>a</sup> |
| 17   | I understand how my work fits into the overall aim of the organisation       | 3,76 <sup>d</sup> | 3,89 <sup>d</sup> | 4,14 <sup>c</sup> |
|  | Total  | 4,30 <sup>b</sup> | 4,36 <sup>a</sup> | 4,71 <sup>a</sup> |
| <i>CHANGE</i>  |  |                   |                   |                   |
| 26   | I have sufficient opportunities to question managers about change at work    | 2,76 <sup>d</sup> | 2,70 <sup>d</sup> | 2,29 <sup>d</sup> |
| 28   | Staff are always consulted about change at work                              | 2,82 <sup>b</sup> | 3,07 <sup>a</sup> | 2,14 <sup>d</sup> |
| 32   | When changes are made at work, I am clear how they will work out in practice | 3,71 <sup>a</sup> | 3,63 <sup>a</sup> | 3,86 <sup>a</sup> |
|  | Total  | 3,10 <sup>b</sup> | 3,14 <sup>b</sup> | 2,76 <sup>d</sup> |
| <sup>a</sup> Green<br><sup>b</sup> Light blue<br><sup>c</sup> Yellow<br><sup>d</sup> Red |  |                   |                   |                   |

Table 3 - Scores in the VDU operators group.

| EXAMINED FIELD IN DRIVERS/RESCUERS |   | Total<br>N =34    | Men<br>N=27       | Women<br>N =7     |
|------------------------------------|---|-------------------|-------------------|-------------------|
| <i>DEMAND</i>                      |   |                   |                   |                   |
| 3                                  | Different groups at work demand things from me that are hard to combine               | 2,24 <sup>a</sup> | 1,93 <sup>a</sup> | 3,14 <sup>a</sup> |
| 6                                  | I have unachievable deadlines   | 2,62 <sup>a</sup> | 2,33 <sup>a</sup> | 3,57 <sup>a</sup> |
| 9                                  | I have to work very intensively   | 2,21 <sup>c</sup> | 2,41 <sup>c</sup> | 1,57 <sup>d</sup> |
| 12                                 | I have to neglect some tasks because I have too much to do                            | 2,44 <sup>a</sup> | 2,26 <sup>a</sup> | 2,71 <sup>a</sup> |
| 16                                 | I am unable to take sufficient breaks   | 2,76 <sup>c</sup> | 2,33 <sup>b</sup> | 3,29 <sup>c</sup> |
| 18                                 | I am pressured to work long hours   | 3,56 <sup>b</sup> | 3,26 <sup>b</sup> | 3,29 <sup>a</sup> |
| 20                                 | I have to work very fast  | 4,00 <sup>a</sup> | 4,00 <sup>b</sup> | 3,86 <sup>d</sup> |
| 22                                 | I have unrealistic time pressures   | 2,53 <sup>a</sup> | 2,07 <sup>a</sup> | 2,86 <sup>a</sup> |
|                                    | Total   | 2,79 <sup>a</sup> | 2,57 <sup>a</sup> | 3,04 <sup>a</sup> |
| <i>CONTROL</i>                     |   |                   |                   |                   |
| 2                                  | I can decide when to take a break   | 3,24 <sup>d</sup> | 2,89 <sup>d</sup> | 4,14 <sup>d</sup> |
| 10                                 | I have a say in my own work speed   | 4,21 <sup>c</sup> | 4,30 <sup>b</sup> | 4,00 <sup>d</sup> |
| 15                                 | I have a choice in deciding how I do my work  | 2,85 <sup>d</sup> | 2,48 <sup>d</sup> | 3,29 <sup>c</sup> |
| 19                                 | I have a choice in deciding what I do at work   | 2,94 <sup>c</sup> | 2,96 <sup>c</sup> | 2,86 <sup>d</sup> |
| 25                                 | I have some say over the way I work   | 3,59 <sup>c</sup> | 3,52 <sup>c</sup> | 4,14 <sup>b</sup> |
| 30                                 | My working time can be flexible   | 4,03 <sup>c</sup> | 4,11 <sup>d</sup> | 3,57 <sup>d</sup> |
|                                    | Total   | 3,48 <sup>d</sup> | 3,38 <sup>d</sup> | 3,67 <sup>d</sup> |
| <i>SUPPORT FROM MANAGER</i>        |   |                   |                   |                   |
| 8                                  | I am given supportive feedback on the work I do                                       | 3,62 <sup>a</sup> | 3,56 <sup>a</sup> | 3,86 <sup>a</sup> |
| 23                                 | I can rely on my line manager to help me out with a work problem                      | 4,09 <sup>b</sup> | 4,19 <sup>b</sup> | 4,00 <sup>c</sup> |
| 29                                 | I can talk to my line manager about something that has upset or annoyed me about work | 3,47 <sup>d</sup> | 3,37 <sup>d</sup> | 3,71 <sup>d</sup> |
| 33                                 | I am supported through emotionally demanding work                                     | 2,94 <sup>a</sup> | 2,85 <sup>a</sup> | 3,43 <sup>a</sup> |
| 35                                 | My line manager encourages me at work   | 3,41 <sup>d</sup> | 3,22 <sup>d</sup> | 3,71 <sup>d</sup> |
|                                    | Total   | 3,51 <sup>b</sup> | 3,44 <sup>c</sup> | 3,74 <sup>a</sup> |

(to be continued)

**Table 3 - (cont.).**

| <i>SUPPORT FROM COLLEAGUES</i> |  |                   |                   |                   |
|--------------------------------|--|-------------------|-------------------|-------------------|
| 7                              | If work gets difficult, my colleagues will help me                           | 3,53 <sup>a</sup> | 3,48 <sup>a</sup> | 3,57 <sup>a</sup> |
| 24                             | I get help and support I need from colleagues                                | 3,82 <sup>a</sup> | 3,78 <sup>a</sup> | 4,43 <sup>a</sup> |
| 27                             | I receive the respect at work I deserve from my colleagues                   | 3,88 <sup>a</sup> | 3,63 <sup>a</sup> | 4,57 <sup>a</sup> |
| 31                             | My colleagues are willing to listen to my work-related problems              | 3,91 <sup>a</sup> | 3,85 <sup>a</sup> | 3,86 <sup>a</sup> |
|                                | Total  | 3,79 <sup>a</sup> | 3,69 <sup>a</sup> | 4,11 <sup>a</sup> |
| <i>RELATIONSHIPS</i>           |  |                   |                   |                   |
| 5                              | I am subject to personal harassment in the form of unkind words or behaviour | 4,39 <sup>a</sup> | 4,41 <sup>a</sup> | 4,71 <sup>d</sup> |
| 14                             | There is friction or anger between colleagues                                | 2,79 <sup>a</sup> | 2,63 <sup>a</sup> | 2,71 <sup>a</sup> |
| 21                             | I am subject to bullying at work   | 3,65 <sup>b</sup> | 3,63 <sup>a</sup> | 4,71 <sup>d</sup> |
| 34                             | Relationships at work are strained   | 2,68 <sup>a</sup> | 2,37 <sup>a</sup> | 3,43 <sup>a</sup> |
|                                | Total  | 3,37 <sup>a</sup> | 3,26 <sup>a</sup> | 3,89 <sup>b</sup> |
| <i>ROLE</i>                    |  |                   |                   |                   |
| 1                              | I am clear what is expected of me at work                                    | 4,03 <sup>a</sup> | 3,89 <sup>a</sup> | 4,57 <sup>a</sup> |
| 4                              | I know how to go about getting my job done                                   | 2,68 <sup>a</sup> | 2,15 <sup>a</sup> | 4,14 <sup>a</sup> |
| 11                             | I am clear what my duties and responsibilities are                           | 3,32 <sup>a</sup> | 2,96 <sup>a</sup> | 4,00 <sup>a</sup> |
| 13                             | I am clear about the goals and objectives for my department                  | 2,74 <sup>c</sup> | 2,33 <sup>d</sup> | 3,57 <sup>a</sup> |
| 17                             | I understand how my work fits into the overall aim of the organisation       | 3,06 <sup>d</sup> | 2,56 <sup>d</sup> | 3,29 <sup>c</sup> |
|                                | Total  | 3,16 <sup>b</sup> | 2,78 <sup>a</sup> | 3,91 <sup>a</sup> |
| <i>CHANGE</i>                  |  |                   |                   |                   |
| 26                             | I have sufficient opportunities to question managers about change at work    | 4,18 <sup>d</sup> | 4,22 <sup>d</sup> | 4,14 <sup>d</sup> |
| 28                             | Staff are always consulted about change at work                              | 3,85 <sup>b</sup> | 4,00 <sup>a</sup> | 3,71 <sup>d</sup> |
| 32                             | When changes are made at work, I am clear how they will work out in practice | 3,68 <sup>a</sup> | 3,56 <sup>a</sup> | 4,29 <sup>a</sup> |
|                                | Total  | 3,90 <sup>b</sup> | 3,93 <sup>b</sup> | 4,05 <sup>d</sup> |

<sup>a</sup> Green

<sup>b</sup> Light blue

<sup>c</sup> Yellow

<sup>d</sup> Red

*Results of items according to job duty*

We then considered the results of the single item for each field, in order to see which aspects were farther away from the standards.

For the drivers/rescuers of both sexes, despite the field "Demand" lying in the green area, we found some critical issues to the questions "I have to work very hard" (yellow area), "I do not have the opportunity to take sufficient breaks" (yellow area), "I'm pressed to work overtime" (blue area).

For the field "Control" in this same population, all the items show the necessity for immediate corrective actions; the greatest problems are found for the questions "I can decide when to take a break" and "I have freedom of choice in deciding how to do my job".

The field "Support from managers", in the same working population, showed a score between the 50<sup>th</sup> and the 80<sup>th</sup> percentile (blue area), but the question "if something disturbed or annoyed me at work I can talk with my boss" scored less than the 20<sup>th</sup> percentile, falling into the red area.

The fields "Support by colleagues" and "Relationships" have instead achieved an excellent level of performance (score higher than the 80<sup>th</sup> percentile).

The fields "Role" and "Change", while achieving a good level of performance (blue area), presented some critical questions: "I am clear about the aims and goals of my department/office" (yellow area), "I understand how my work fits in the overall goals of the organization" (red area) and "I have sufficient opportunity to ask the leaders for explanations about changes related to work" (red area).

In the population of VDU operators, the overall result for the field "Demand" falls into the red area, with the most critical issues identified being irreconcilable work requests, unattainable deadlines, excessive commitments, insufficiency of breaks and excessive work speed.

The field "Control", while falling in blue area, presents some questions that obtained a score below the 20<sup>th</sup> percentile: "I can decide when to take a break," "I have freedom of choice in deciding how to do my job," "I have a say on how to do my job".

In the field "Support from the managers" the questions that fall in red area and need immediate corrective actions are those related to the lack of opportunity to speak with superiors in the case of work problems, the poor support in the case of emotionally challenging jobs and the little encouragement from managers.

The field "Support by colleagues" achieved a good level of overall performance, except for the question "if the job becomes difficult, I can count on the help of my colleagues," which achieved a score below the 20<sup>th</sup> percentile.

The fields "Relationships" and "Role" highlight the necessity for immediate interventions in all the items, with the exception of the question concerning the presence of personal abuse in the workplace.

The field "Change", on the contrary, reaches the management standard for all the items.

*Results: total and for items, according to gender and job duty*

We repeated the evaluation dividing the results obtained from men and women, in order to highlight any difference related to gender.

In the drivers/rescuers population no significant differences related to gender are observed as for the overall results of the fields "Demand", "Control" and "Support from colleagues", while there are differences in the fields "Support from managers", "Relationships", "Role" and "Change".

In the field "Demand" there is a difference between men and women in the individual items, especially about the intensity of the work (yellow area for men and red area for women), the chance to take sufficient breaks (light blue area for men and yellow area for women), and the speed of carrying out the work (light blue area for men and red area for women).

In the field "Control" the main differences between the genders are found for the question "I have a say in deciding the speed at which to do my job" (light blue area for men and red area for women).

The overall result of the field "Support from managers" shows different results for the genders: yellow area for men, green area for women, documenting the necessity of corrective targeted action for the first.

The fields "Support from colleagues" and "Relationships" have an excellent level of performance in the overall results for both genders.

Nevertheless, individual items in "Relationships" show differences between men and women. Women show critical situations for the items "I am subjected to personal harassment in the form of rude words or behaviors" and "I am subjected to bullying and harassment at work" (red area), unlike men (green area).

In the field "Role" the biggest difference between the two genders emerges in the item dealing with the goals or objectives of the work department, with a lower score at the 20<sup>th</sup> percentile in men (red area) and a score above the 80<sup>th</sup> percentile in women (green area).

In the field "Change", there is a significant difference between men and women as for the item "the workers are always consulted about changes in the work," falling in the green area for men and in the red area for women.

In the VDU operators the overall scores in the individual fields appear to be the same for both genders for "Role" and "Change", while they are different in "Demand", "Control", "Support from managers", "Support from colleagues", and "Relationships".

In particular, in the field "Demand" the overall results fall into the red area for men and into the yellow area for women; the major differences are found for items regarding the inability to combine work demands with each other (red area for men and blue area for women), unreachable deadlines (red area for men and blue area for women) and work intensity (light blue area for men and red area for women).

In the field "Control" men and women show differences for the items "I can decide when to take a break" (red area for men and green area for women) and "I have a say on how to do my job" (red area for men and green area for women).

In the field "Support from managers" there is a difference in the overall results between the two genders (yellow area for men and green area women); this difference is relevant especially for the item that investigates support in emotionally demanding work, where women have an optimum perception of achievement of standards (green area), while men perceive a critical situation (red area).

In the field "Support by colleagues" the overall scores between men and women show differences.

In fact, men obtain a score between the 20<sup>th</sup> and the 50<sup>th</sup> percentile, while women score above the 80<sup>th</sup> percentile, with satisfaction of the management standard.

Differences emerge also in the overall scores of the field "Relations": men have a highly negative score (red area), differently from women (blue area).

The field "Role" shows no difference in the overall results between the two genders; analyzing the individual items however, it emerges that men do not have a clear idea what is expected from them at work (red area) as opposed to women (green area).

## Discussion

There is considerable evidence in the literature that individuals who spend a stressful life may have an increased risk of developing various diseases. In fact it is well documented that psychological stress leads to a series of consequences such as poor concentration and memory, poor learning (7), allergies, headaches, eating disorders (1), nervousness, depression, anxiety, irritability (21).

The causes of stress in the workplace are varied, divided by Hacker (22) in two main categories:

1. factors related to the context of the work (job category and conditions of the definition of risk)
2. factors related to the content of the work.

All the stressors involved in organizing work, career development and interpersonal relationships belong to the first category; those which undoubtedly are more responsible for the development of work-related stress are: reduced participation in decision making, horizontal organizational structure, organizational structure not clearly defined, discriminatory policies, low social support from colleagues, interpersonal conflict, unfair distribution of work, conflicting demands between home and work, and harassment.

Otherwise, the stressor risk factors due to the work environment and equipment, the division of tasks and



planning, the hours of work and workload, belong to the category of job content. The most representative stressors of this category are: shift work, night work, excessive number of hours, unwanted overtime, little free time, uncertain or conflicting tasks, monotonous work, job needing high concentration, problems of maintenance or repair of structures and work equipment, exposure to harmful and/or carcinogenic substances.

Our study shows that VDU operators, according to the scores, need immediate corrective action in several areas.

In the field "Demand", investigating issues such as workload, work organization and work environment, the drivers/rescuers achieve an overall score above the 80<sup>th</sup> percentile (green area), with the achievement of the management standard. This situation must be maintained over time, considering that excessive work demands, overtime, night and shift work are considered causes of work-related stress. In a survey conducted on 21 paramedics (10), it was found that rotating shift workers have higher levels of stress than workers with only diurnal shifts.

The VDU operators, still in the field "Demand", obtain an overall score falling into the red area; this is in agreement with the related literature, which documents that long working hours (3, 4), the few days off (9), the work overload (3-6) and the perception of the presence of a risk for themselves in the workplace (11) are important sources of stress. Furthermore, in a study (23) aimed at identifying the factors that determine the occurrence of work-related stress on 285 VDU operators, it emerged that there is a positive correlation between many hours of work and symptoms of ocular discomfort and perceived stress.

In the field "Control", the drivers/rescuers scored below the 20<sup>th</sup> percentile; the situation about the autonomy of the workers on how to carry out their work is more critical than in the VDU operators. The perception of stress by the drivers/rescuers is similar to that in a study (18) where it was found that a major source of concern in the workplace, which can lead to the onset of stress, is the lack of decision-making autonomy of the staff.

In the field "Support from managers" the overall results of the two populations are very similar, and the male VDU operators show a very critical perception about the little support from superiors in the case of emotionally demanding work.

We can say about these findings that, if the support from superiors seems to be able to reduce work-related stress, on the contrary, the lack of support and the psychological pressure can increase the occupational stress.

Literature, in fact, confirms that some of the main determinants of work-related stress are the psychological pressure by the manager and the submission to a hierarchy (2, 15).

In the field "Support from colleagues" the drivers/rescuers reach the ideal situation, with the achievement of the management standard (total score greater than the 80<sup>th</sup> percentile). This result, despite the ideal achievement, encourages a way to promote a work environment characterized by collaboration, mutual support

and dialogue so this situation is maintained over time. Literature, in fact, has shown that the lack of support from colleagues is an important source of stress (13), while communication and collaboration among these is a primary preventive measure (24).

The field "Relationships", which includes the promotion of positive working to avoid conflict and dealing with unacceptable behavior, is quite critical for VDU operators who are in the red area, while the drivers/rescuers are in the green area.

Given the great importance of this area in the assessment, management and prevention of work-related stress, several Authors agree that proper personnel management, the implementation of measures related to communication among the workers and the creation of a suitable working environment are essential measures to control the risk of work-related stress (2, 24, 25). In the field "Role", the VDU operators obtain scores lower than the 20<sup>th</sup> percentile, documenting a lack of awareness on how to do the job and the difficult identification of career goals. This result matches literature that shows high stress levels in workers experiencing organizational ambiguity in their roles and in the company organization, and in people who do not have very clear goals to reach in their working environment (14). This problem does not emerge in the group of drivers/rescuers (green area).

In the field "Change" the group of drivers/rescuers shows more critical situations with respect to the VDU operators (green area).

About the distinction between the two genders, the study reveals that female VDU operators have performed with less worry than men in all fields, except "Role" and "Change", in which women report overall scores equal to those of men. This result seems to be related to a greater propensity of women to seek help for problems related to work, which leads to a reduction of conflicts and increased dialogue (26).

Women drivers/rescuers, however, report the most critical scores in the field "Relationships" (reporting to be subjected to personal harassment and bullying) and "Change" (feeling of not being consulted about the changes in the work).

In conclusion, work-related stress can have a negative impact on several aspects of the health of workers and of work organizations.

The features and the proved validity of the questionnaire-indicating tool proposed by INAIL and developed by the HSE (27, 28) make it a useful tool during the medical surveillance visits at work.

In fact, it allows us to analyze the causes of subjective stress quickly and easily, even on large and different working populations.

The results of our study show there are many variables that can positively influence the subjective perception of stress in workers.

Furthermore, analysis of the literature on this subject shows that high levels of stress are associated with different consequences which include emotional, cognitive, behavioral and pathological manifestations.

The most important are tension, insecurity, irritability, anxiety and depression (7, 29), leading to higher prob-

ability of errors and accidents, difficulty in decision making, decline in performance (both in terms of quantity and quality), frequent delays, addiction to alcohol, smoking and/or sedative or stimulant substances, eating disorders (1), chronic fatigue, tension headache, low back pain, anxiety disorders, sleep disturbances, vision problems and musculoskeletal disorders (7, 30). Since the human and social cost of work-related stress is very high, preventive measures play a major role. Among the various strategies that can be implemented there are measures relating to the management and the communication and collaboration among colleagues (24), the creation of a work environment suitable to meet the needs of workers (2) and the implementation of a strategies set of coping (cognitive evaluation of events, identification of discomfort reaction, promotion of social and personal resources) to reduce stress in the workplace (25, 31). Therefore, future efforts should focus on understanding the psycho-social, organizational and individual problems related to stress and the consequent implementation of preventive measures.

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