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WORKING PSYCHOSOCIAL CONDITIONS AND HEALTH EFFECTS FOR VIDEO DISPLAY TERMINALS USERS IN SOME ADMINISTRATIVE ACTIVITIES

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ABSTRACT

Working with video display terminals (VDTs) involves different risk factors, including psychosocial risks, that have been recognized as important causes to employees' health problems (both mental and physical). This is why one of the employers responsibilities is to change work conditions in order to improve the occupational psychosocial environment of all employees and VDT users as well. This paper aimed to explore how psychosocial and ergonomics aspects of VDT work tasks are related to work related health problems, especially to occupational stress symptoms, as perceived by the employees.

KEYWORDS: psychosocial factors, video display terminals, work environment, work conditions

1. Introduction

During the last more than 35 years, the population of video display terminal (VDT) workers determined an increased incidence of work related health problems. The problems with higher frequency include visual, musculoskeletal (Bergqvist, Wolgast, Nilsson & Voss, 1995; Travers & Stanton 2002), and stress related complaints (Sullivan, 1989). More recently, working with VDTs have been recognized and accepted as a work condition that includes psychosocial aspects, nowadays important factors that contribute to employees' health problems – both mental and physical (Tomei et al., 2006; Hilty et al., 2022).

Also, working with VDTs involves performing important cognitive work tasks and this is why some authors considered that *"in between fatiguing physical work*

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tasks may allow recovery and reduce stress without losing productive working time" (Mixter et al., 2021). The recovery effect is determined especially by the temporal pattern of such alternations, influencing stress symptoms and fatigue levels as well; the complexity of the cognitive task could also be a likely determinant, aspect rarely considered in common work with VDTs, but only related to some specific VDTs work tasks.

As well as the authors mentioned above and other specialists, we considered VDT as any work equipment that follows the criteria from *Council Directive of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC)*.

In this context, the general aim of the study was to analyse the perceived health problems, including stress symptoms (psychological and physical) as perceived by VDTs users in relation to duration of VDT work exposure, and other conditions of the working environment (ergonomic characteristics of the work station, working environments as perceived by workers, etc.), medical data (perceived/diagnosticated health problems) and job satisfaction.

The paper presents a series of results recorded in an extended study aiming to assess working conditions, risks and occupational demands in some administrative activities – especially for personnel working in financial – accountability departments.

This approach is starting from the legal provisions of occupational safety and health regarding the identification and monitoring of occupational risks, the identification of word demands that may generate symptoms of reversible impairments of the physical and mental health of personnel, reductions in capacity work, the appearance of risky behaviours in the activity.

2. Methods

The current approach in the field of safety and health at work considers the multi-factorial, multidimensional and therefore multidisciplinary approach of risks, as well as targeted actions, on a certain group of activities/specific risks/population.

Occupational risk factors may arise from deficiencies of one or more components of the work system: user – work equipment – workload/work task and its demands – work environment. One and the same risk factor for safety and health results from the cumulative action of some professional, extra-professional and individual factors (eventual hereditary-collateral and personal physiological and pathological antecedents).

The human individual is himself a bio-psycho-social entity, which reacts as a unitary whole to the action of occupational factors, and the reactions can be manifested on any of the somatic, psycho-physiological, behavioural levels, depending on the nature of the risks and possible interactions.

Starting from these premises, in the presented study, a complex, ergonomic methodology was established for use, including:

– The technical, organizational and psycho-physiological analysis of the activity of the personnel category established to be investigated and of the conditions for work task accomplishment (environmental factors, organizational factors, etc.).

– The analysis of work demands.

– Identification of the body's response to the action of occupational risk factors in relation to the investigated personnel category, response reflected in the health status of the personnel.

In order to highlight the conditions in which the studied activities are carried out, it was done: analysis of jobs from an ergonomic point of view; analysis of the data coming from some measurement of the work environment factors which, through

the characteristics and the level of the parameters, address specific demands to the personnel.

The study utilized self-administered questionnaires in order to obtain information on symptoms, medical conditions, working environments and the job satisfaction. The average time the participants filled in the applied questionnaires was 30 minutes. We recorded no cases when the length of the questionnaires was negatively related to the willingness to participate at the study.

A questionnaire was used regarding the activities carried out through the VDT, based on the data related to the characteristics of the activity and the conditions in which it is carried out, as well as the possible repercussions on the comfort and health of the operator.

Thus, the information contained is grouped in relation to the following categories of factors and problems: individual (personal) factors; problems related to the organization of the activity; problems with the screen; problems with the document; problems related to the job; problems related to the physical environment; discomfort or fatigue factors; symptoms of general fatigue; fatigue symptoms with certain localizations; symptoms of chronic physical and/or mental suffering.

For correlating some identified mental demands and in order to identify some additional psychosocial risk factors, the methodology included The Copenhagen Psychosocial Questionnaire (COPSOQ) – Romanian variant (Iordache & Petreanu, 2014).

The study also used objective measurements to provide information on various ergonomic aspects (eg. placement and sizing of the work stations).

Participants: 126 employees from administration, working in financial-accountability departments, carrying out specific tasks. The stratified sampling was used, taking into account criteria as age, gender, and work seniority, adjusted to the population size.

3. Results

From the analysis of the activities, of the results of the applied questionnaires, as well as the discussions with the investigated personnel, the following emerged:

The professional demands, for the investigated personnel category, are predominantly mental, of high level, representing themselves a factor of work strain in the activity.

Among the ***mental demands***, involved, in particular, in the accomplishment of the work task, were highlighted as indicators of the mental effort: memory (short and long term memory); attention (with the dimensions of focused attention, distributive attention); thinking (capacity for analysis and synthesis, decision, problem solving, etc.); organizational and planning skills.

The factors that have a reported contribution to the level of mental effort are those determined by: the increased volume of activity distributed on an insufficient number of staff; high responsibility in relation to the results of the activity; the temporal demands (time pressure), sometimes; work pace, in most situations a factor of mental effort/stress, perceived as predominantly imposed, determined by temporal demands and high workload; communication with different types of people.

Visual work demands appear as a result of the need to follow various information on computer screens or as a result of the use of VDT in the performance of specific work tasks. Thus, the need to correctly and quickly perceive the data displayed and on the primary documents advertises, in particular: accommodation – convergence; form discrimination (visual acuity); binocular overlap and fusion; adaptation in photopic and mesopic vision (adaptation function); stereoscopic vision and colour sense.

These functions participate in a differentiated way to achieve a correct "visualization" in following the displayed information to the alternation of eye movements between the different elements of the workplace. In relation to the landmarks of the visual activity, the gaze must be directed in different directions, under conditions of significant visual demand, due to: the frequent change of the eye-task distance and the differences between the luminance's of the different explored areas.

The realization of specific work tasks that involve the use of VDT requires special conditions in terms of visual acuity, light sense, speed and precision of signal perception. Also, the need for means of perception fixed by experience leads to the formation of perceptive algorithms in relation to different categories of information/tracked data.

Postural work demands: The position of the operator (maintained seated for a long time) can attract a certain degree of postural stress, especially in the case of the existence of some ergonomic deficiencies in the dimensioning and placement of the work station, the organization of the work, the lighting of the work station.

Other demands refer to the position and movements of the spine and the upper limb as a whole, and also to the position of the lower limbs.

In parallel, the study participants also reported the action of some risk factors for health related to working conditions, as presented in Tables no. 1 and no. 2.

The data were subjected to a multivariate analysis carried out with SPSS (Statistical Package for the Social Sciences), in order to identify the main factors associated with different stress, visual and musculoskeletal problems. As the variance proportion is the variance in all variables that is accounted for by a single factor, this analysis was used as a measure of dispersion of participants' answers related to health and stress problems and working conditions, respectively.

Table no. 1

Aspects/factors related to health and stress problems

Factors	***Variance proportion (%)****	***Factors proportion***
Visual fatigue	14.59	35.31
Symptoms: nervousness and intellectual performance	17.81	7.79
Work interfering in personal life	26.45	6.48
Mental fatigue and exhaustion	28.93	6.00
Sleep disorders and work	31.39	5.95
Backache and neck ache	33.61	5.37
Symptoms: palpitation/chest pain	35.68	5.01
Appetite disturbance	37.67	4.82
Normal blood pressure	39.56	4.57
General fatigue	41.32	4.26

*Cumulated frequency

Table no. 2

Aspects/factors related to working conditions

Factors	***Variance proportion (%)****	***Factors proportion***
Environment, equipment, work furniture	10.02	18.32
Distress: work overload	18.22	14.99
Relationship with superiors and colleagues: support	24.70	11.85
Workers' participation	28.77	7.44

Factors	*Variance proportion (%)**	*Factors proportion*
Work requirements: decision and responsibility	32.83	7.42
Developing opportunities	36.32	6.38
Distress: equipment	39.42	5.67
Work satisfaction	42.39	5.43
*Cumulated frequency		

In relation to the work psychosocial conditions and work demands that were reported also as stress factors, as well as of psychosocial risk factors, identified through Copenhagen Questionnaire (COPSOQ), the situation is presented in the Figure no. 1 below.

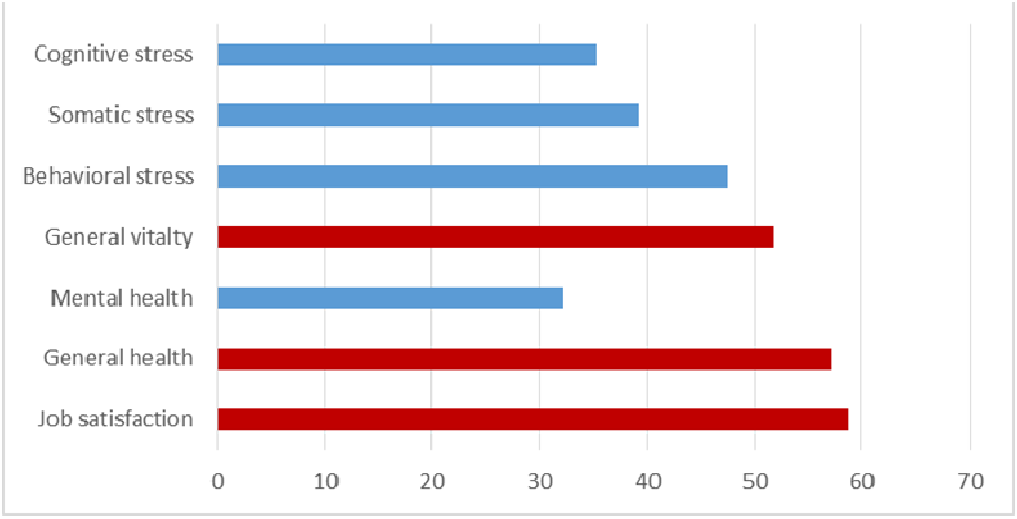


Figure no. 1: *Level of stress factors by reference to the symptomatology of stress*
(Source: Authors)

4. Discussion

Working with visual display terminals (VDTs) includes, as many other work tasks, both benefits and risks. The discussions on the relationship between some psychological or somatic disorders (e.g. work related stress, musculoskeletal disorders) and work with VDT usually focus around occupational aspcets (e.g. difficult or constrained posture, ergonomic design of the workplace and equipment), psychosocial factors/stress factors (e.g., high job demands, less control, repetitive tasks, lack or variety and social support), and other individual factors related to diferent psychological/psychosocial aspects (e.g., age, previous disorders or injuries, emotional, stress).

Consideration of the literature survey as well as the results of this study indicate that employees working with VDT tend to report more frequently musculoskeletal problems, visual fatigue (during performing work tasks or at the end of the workdays), and symptoms of occupational stress.

A special attention should be considered for mental health of VDT users, especially for the symptoms correlated with work aspects. World Health Organisation (1987) defined the associations between work and mental health of VDT users as *"stress related disorders"*. These disorders demonstrated the involvement of a large scale of aspects, including physiological, psychological, and behavioural dimensions.

As showed in the Results section, the psychological symptoms more frequently

reported by the participants in the present study were anxiety, irritability, lack of general vitality as well as general and visual fatigue.

We also recorded that the participants opinionated that specific ergonomic improvements in work environment, workstation and work task design could contribute in reducing or eliminating these health related problems.

Other variables that could have influenced the answers of the participants in the study (eg pre-existing morbidities) were taken into account and correlated with the length of time in the VDT activity, the lifestyle and the general state of health, aspects included in the applied questionnaires.

At the same time, sustained efforts are needed to sensitize and raise awareness of management and all interested parties (stakeholders) regarding the opportunities and advantages of integrating human-computer interaction in the field of ergonomics, including by updating the existing regulation of the field, so that the elaborated decisions to cover as many aspects of socio-technical or work systems design, less known or not yet sufficiently explained, as well as associated managerial processes.

5. Conclusion

The study emphasized that VDT users that perceived less control over their work tasks reported a higher percentage of stress symptoms. These employees reported also low levels of job satisfaction, but also higher levels of muscular tension, depression and general fatigue symptoms than VDT users with higher level of control and work autonomy.

A correlation between symptomatology and work exposure was identified, whereby symptoms frequency and intensity appeared to increase as duration of VDT work exposure increased.

The present study was a first in Romania to approach the activity at VDT from the point of view of its relationship with health and stress at work, as perceived by employees in the finance-accountability field of the central administration. Therefore, we believe that the results of the study can be a starting point for the development of measures to prevent occupational risks for work with VDT and to maintain the health of employees.

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