

Work conditions and mental demands in museum activities

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Abstract. The paper presents some results of an extended study on work conditions and mental demands in culture activities – especially for museum personnel. The study aimed to emphasize the occupational risks and nocivities and the mental (neuro-psychical) demands of activity. A complex methodology was used, including different techniques and instruments concerning the activity characteristics and the subjective assessment of the work demands as well.

1 Introduction

The paper presents a series of results recorded in an extended study aiming to assess working conditions, risks and occupational demands in some cultural activities - especially for museum personnel.

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

2 Methods

The current approach in the field of occupational safety and health 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 external / occupational factors, and the reactions can be manifested

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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 results of the measurement of the work environment factors which, through the characteristics and the level of the parameters, address specific demands to the personnel.

The work activity consists of a combination of tasks performed with a certain technical equipment, in a certain work environment, with a specific authority and quality, in a certain organizational structure. Each of these factors is likely to influence the effort in the activity [1]. As the work demand represents the effort felt by the individual depending on the level of his abilities, and depending at the same time on professional and individual factors, its analysis and evaluation must also be multidimensional and multi-factorial. In this sense, we considered that it is necessary to use, depending on the specifics of the task (nature, characteristics, mental levels involved etc.) more criteria, more evaluation techniques, so that their results, complementary, can be correlated, and to allow an assessment as close as possible to reality.

According to the Standard SR EN ISO 10075 [2, 3], the objectification and measurement of the mental effort in activity can be achieved through the following categories of indicators and techniques:

- (1). indicators and techniques for analysis and evaluation of workload requirements, which aim to assess its objective parameters: time requirements; complexity; cognitive requirements etc.;
- (2) indicators and techniques of subjective evaluation: scales of appreciation of the subjective sensation of effort, of the individual physical and mental state during the activity, at its end and of the individual extra-professional state (as a prolonged effect of carrying out a certain task);
- (3). performance indicators and techniques, which allow obtaining indicators of neuropsychic effort through performance elements in performing the task or behaviour (changes in operating strategies depending on the level of effort);
- (4). Psycho-physiological indicators and techniques, for evaluating the dynamics of some psycho-physiological and biochemical parameters involved in carrying out the work task during a work period.

In this context, we considered the indicators for the analysis of work demands as representative of the general purpose of the study, using, in this sense, a check-list adapted to the population of employees who participated in the study.

Other methods used: technical and technological documents study, job descriptions, analysis of work regime; medical files analysis; analysis of the results of risk level per work post / activity evaluation; questionnaires, checklists, interviews.

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 [4].

3 Results

3.1 Analysis of working conditions and risks

From this perspective of, it was found that harmful risk factors are related to the presence of chemical and biological agents, and inadequate lighting and microclimate conditions.

Biological risks: The presence of mesophilic, haemolytic bioaerosols and fungi was highlighted in the investigated rooms. The highlighting of these types of biological agents was done by using specific sampling and culture media. The analyses performed were quantitative (the total number of colonies in the air was determined).

Chemical risks: Powders without specific effect (respirable fraction), which give negative effects on the respiratory tract and lungs, leading to chronic bronchitis and emphysema, diseases included in the category of chronic obstructive pulmonary disease [6]. Substances used in restoration workshops and laboratories are specific to those works, which present a health risk and whose replacement presents difficulties, given the very strict functional characteristics that they must comply with.

Workplace lighting has quantitative deficiencies: insufficient lighting levels, values below the values recommended by the standards.

The microclimate at the workplace influences the safety, health and work capacity of the personnel in the situation when its parameters do not fall within certain comfort limits according to the regulations in force (SR EN ISO 7730: 2006, SR EN 12831: 2004) [7, 8].

According to the registration reports, the operating temperature values were below the values recommended by the reference standards at some workplaces where determinations were made.

Participants: 150 employees from art and history museums, carrying out specific museum activities (as guides, experts working in restoration workshops and laboratories, research scientists etc.). The stratified sampling was used, taking into account criteria as age, gender, work seniority, adjusted to the population size.

3.2 Analysis of activity and mental demands

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 (neuropsychic), of high level, representing themselves a factor of work strain in the activity.

The factors that contribute to the level of mental effort are those determined by: the increased volume of activity distributed on an insufficient number of staff; the complexity of the carried out activity (e.g. conservation, heritage research - analysis, filing, etc.); high responsibility in relation to the patrimony objects from the deposits; the temporal demands (time pressure), sometimes (for the organization of exhibitions, loans for exhibitions in which the museums collaborate, tasks related to requests for reproduction of art objects in journals, art albums, speciality books etc.); work pace, in most situations is a factor of mental effort / stress, is perceived as predominantly imposed, determined by temporal demands and high workload; communication with different types of people at institutional and inter-institutional level (e.g., for organizing exhibitions, events).

In parallel and, partially, following the occupational mental demands, the study participants also reported the action of some psychosocial risk factors / stress factors generated by: the demands coming from the special status of the institution and its associated image at national level; the professional exigencies - predominantly of mental nature, due to the nature and characteristics of the work task, of the conditions for its

accomplishment, of the work equipment; responsibility in relation to the entire activity they carry out; very high professional standards, imposed by the status of the institution, but also self-imposed; worries related to the managed patrimony; the difficulty of attracting new specialists, with the necessary expertise, due to their lack on the labour market, as well as the insufficient financial reward.

Among the mental capacities, 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.); the ability to communicate and cooperate with different types of people at institutional level and outside the institution; organizational and planning skills.

3.3 Analysis of health state

In museum activity, work related diseases have been identified, as defined by the legislation in force, caused by exposure to occupational hazards and overloads, such as chemical hazards, biological agents, electromagnetic fields, visual, neuropsychic and postural overloads.

The relevant pathology in relation to the professional overloads, mainly identified during the periodic medical check-ups, is of several types:

The ophthalmological type, in response to visual analyser overload, insufficient lighting, includes accommodative asthenopathy, medium / strong myopia, farsightedness, astigmatism - (ranging from 26% to 33% of the investigated staff);

The allergic type, in response to various environmental factors such as chemical agents (ozone, chemicals used in conservation and restoration activities), archive dust / molds, includes asthma, chronic bronchitis, laryngitis, sinusitis and rhinitis (ranging from 10% to 12%), ophthalmic impairment such as pruritus and catarrh of the eye, frequent conjunctivitis, occurring exclusively in connection with the workplace (around 8%), atopic / eczematous dermatitis (around 2%), and drug allergies;

The locomotor type, in response to musculoskeletal overload, includes: discopathy / cervical and lumbar disc herniation (ranging from 12% to as high as 34%), contractions of the paravertebral muscles / nonspecific muscle pain at the end of the work schedule (as high as 38%); work related stress is also in relation to discopathy / disc herniation;

The cardiovascular type, in response to neuropsychic overload, and sometimes through the combined action of work related stress and exposure to electromagnetic fields, includes hypertension, heart rhythm disorders (sinus tachycardia, atrial fibrillation), angina pectoris, coronary ischemia (ranging from 25 to 32%); in response to locomotor system overload, hydrostatic varicose veins / deep lower limbs trombophlebitis also occur (up to 10%);

In response to neuropsychic overload also occur dysmetabolic syndromes such as dyslipidemia, DM (ranging from 7% to 11%), digestive disorders such as gastritis, gastroduodenal ulcers, irritable bowel syndrome (around 7%), psychiatric disorders such as depression, anxiety disorders, reactive anxiety disorders (around 4%); through the combined action of work related stress and exposure to electromagnetic fields also occurs the asthenovegetative syndrome (around 5%);

The questionnaires applied to the workers have highlighted a subjective symptomatology directly related to the specifics of the activity and the conditions of achievement, with visual, postural, neuropsychic and neuropsychosensory overload: eye, visual and mental fatigue, both during and at the end of the activity; ocular and visual symptoms; muscular and articular signs and symptoms; sleeping disorders; irritability etc. Thus, the impact of occupational hazards and overloads on employees' health is significant. Occupational risks cannot be eliminated or significantly reduced by technical-

organizational or medical measures, considering the nature and content of the activity, as well as the conditions for its accomplishment.

In relation to the level mental 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 following table and figure (Table 1 and Figure 1).

Table 1. Levels of mental demands and psychosocial risk factors (COPSOQ).

Mental demands	Level
Quantitative / temporal demands	68.2
Cognitive demands	88.7
Emotional demands	60.8
Hidden emotions demands	55
Sensory-perceptive demands	90
Psychosocial risk factors	
Responsibilities	76
Influence	57
Development opportunities	43.4
Autonomy	39.6
Involvement in activity	43.8
Information (consult)	39
Role clarity	25.2
Role conflicts	32.8
Leadership	45
Social support (from fellows and superiors)	39.2
Feedback	37.8
Communication possibilities	34.4
Team spirit	34
Fear of unemployment / job insecurity	28
Responsibilities	76

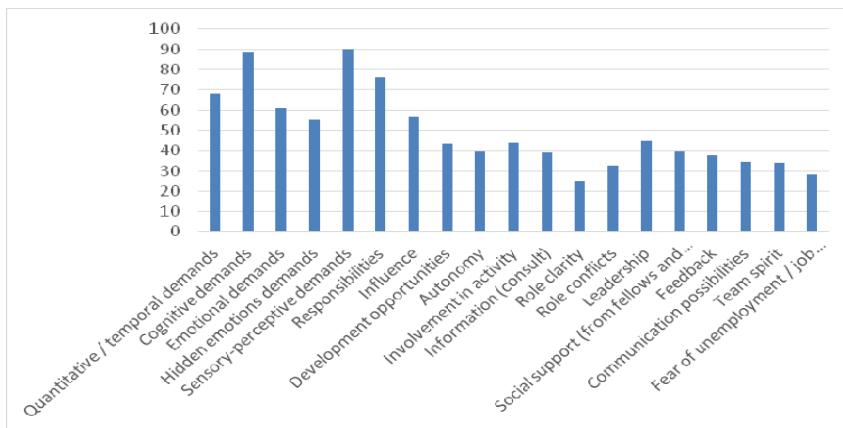


Fig. 1. Levels of mental demands and psychosocial risk factors (COPSOQ).

4 Conclusions

The investigated personnel is subject to a combination of risk factors and occupational stress (injury and illness): biological, chemical risks, poor lighting and microclimate conditions, mental stress.

In relation to the professional psychosocial risk factors in the case of the studied activities, we concluded that among them are the intrinsic factors of the workload, i.e. those that arise from the work content and determine a certain professional effort (mainly mental - sensory, cognitive, emotional), which can constitute an occupational risk factor itself when leading to situations of overload.

The results of the investigations regarding this category of personnel, highlight the fact that the activity of the personnel of the national museums, by its nature and content and by the conditions of its accomplishment, present characteristics that could lead to premature reduction of work capacity, with serious consequences on safety and health, which makes jobs and working conditions at least special, in terms of legal requirements.

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