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POSSIBILITIES AND CONSTRAINTS OF APPLICATION OF THE WERA METHOD FOR RISK ASSESSMENT ASSOCIATED WITH VDT WORK

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Abstract. *The WERA is a relatively new method, which has been used for assessment of risk factors, associated with work-related musculoskeletal disorders. The method was tested previously at the plasterer workplace by the authors of this method. Since there are no published data about the application of the WERA method on tasks where is dominant the static work, the authors of this paper consider that is of importance to examine the sensitivity of this method in occupations where is prevalent the static working activity, such as it is in the case of VDT work. VDT work is one of the activities that is performed in sitting position, which does not require special tools, and for which is characteristic certain static stress of large musculo - skeletal regions. Possibilities and constraints of the WERA method are examined in this preliminary study, which was performed on a relatively small group of VDT users.*

INTRODUCTION

The Workplace Ergonomic Risk Assessment (WERA) represents an observational tool, which has developed to provide a method for controlling of the working tasks, in relation to the exposure to the physical risk factors, associated with Work-related Musculoskeletal Disorders (WMSD).

The WERA tool covers six physical risk factors, including posture, repetition, forceful, vibration, contact stress and task duration, and it involves the five main body regions for the assessment (shoulder, wrist, back, neck and leg). It has a scoring system and action levels, which provide a guide to the assessment of levels of risk and indicating the character of action that should be undertaken. This tool has been tested in terms of reliability, validity and usability during the development process. Because the WERA tool is a "pen and paper" technique that can be used without any special equipment, it also can be performed for any workplace without disruption of workers' activity (Rani et al, Rahman et al).

PROBLEM

As already mentioned, WERA method is intended to assess the risk of musculo - skeletal disorders in different workplaces. The authors of this method, Rahman et al, did not specify any restrictions regarding the application of this method in terms of types of work activities to which this method can be applied. By the authors themselves, this method was tested at the plasterer workplace. Work activity in this area is characterized by the continuous dynamic work. According to the above-mentioned authors, WERA method proved to be sufficiently sensitive instrument for risk assessment of the analyzed workplace.

ANALYSIS AND DISCUSION OF THE MODEL

Since the WERA method is not tested on tasks where is dominant the static work, the authors of this paper consider that is of importance to examine the sensitivity of this method in occupations where is prevalent the static working activity. VDT work is one of the activities that is performed in sitting position, which does not require special tools, and for which is characteristic certain static stress of large musculo - skeletal regions. Bearing in mind that the work on VDT workplaces over a longer period of time is associated with the emergence of numerous musculo - skeletal disorders (Malinska and Bugajska, Wilkens), this workplace was chosen to test the sensitivity of the method WERA. The main hypothesis that is necessary to check consists in assumption that the WERA method is sensitive enough, in terms of risk assessment at VDT workplaces.

METHOD

The procedure for using the WERA method can be described in short through five steps (Rani et al), as follows:

Observe the job/task

Observe the job/task in order to formulate a general ergonomic workplace assessment, including the impact of work layout and environment, use of equipment, and behaviour of the worker with respect to risk taking. If it is possible, record the data by making of photos or by using of a video camera.

Select the job/task for assessment

Decide which job/task to analyze from the observation that was described in the first step. For this purpose, the following criteria can be used:

- the most frequent activity of the job/task
- extreme positions of body parts, unstable or awkward postures
- the job/ task that is known to cause discomfort
- requires the greatest forces, involves a contact stress or use of a vibration tool.

Rate the job/task

Using the WERA tool, calculate the score for each item (risk factor) including parts A and B. The part A consists of five main body areas, including the shoulder, wrists, back, neck and legs. This part covers two risk factors for each body part, including posture and repetition. The part B consists of four risk factors, including forceful, vibration, contact stress and task duration.

Calculate the score relating the exposure

Calculate the score relating to each item (parts A and B) and the final score. Register the numbers at the crossing point (of chosen columns and rows). For example, in the part A, for items 1-5, pairs for posture and repetition should be chosen. In the part B, for items 6-8, the calculations should be performed, taking into account determined postures (from the part A). After calculating the score for each item of the risk factor (items 1-9), calculate the total score.

Consider the action level

Based on the value of final score, assess the risk and choose the action level, according to the next classification:

- the task is acceptable (the final score of 18-27, low risk level)
- task requires the change, and further examination is needed (the final score of 28-44, medium risk level)
- the task is not acceptable, and requires the change immediately (the final score of 45-54, high risk level).

As the comparative methods, the method of interviewing of VDT users was used, method of observation (independent of the WERA method), as well as the method of indirect observation, based on recording of activities at workplaces by using a camera. The main purpose of the interviewing method consisted in collecting information related to basic difficulties and obstacles in the work of VDT users. The method of observation was conducted in order to analyze work activities to the observed workplaces. Recording using a camera (making of digital photographic record) was used in order to implement the subsequent visual analysis and for identification of risk elements in the work process.
The risk was estimated at five VDT workplaces. Work activity was primarily focused on data input and editing. The average age of users was 30.8 years. The average time of use of computers amounted to 6.58 years.

RESULTS

Results obtained by the WERA method are shown in the concise form in table 1. This table contains the results in terms of scores for all nine items that are involved in the risk assessment using the WERA method, to all workplaces that are included on the assessment.

WP	Score for the WERA assessment									Final score	Action level
	SH	WR	BC	NC	LG	FC	VB	CS	TD		
1	2	6	3	4	4	3	3	3	4	32	Medium
2	3	5	2	4	4	2	3	3	4	30	Medium
3	3	5	2	4	4	2	3	3	4	30	Medium
4	2	5	2	4	4	2	3	3	4	29	Medium
5	2	5	2	4	4	2	3	3	4	29	Medium
Mean	2.4	5.2	2.2	4	4	2.2	3	3	4	30	Medium

Table 1. Scores obtained by the WERA method, per items and total, for all workplaces that are included in the risk assessment.

Abbrevation used in table 1: SH - shoulder, WR - wrist, BC - beck, NC - neck, LG - leg, FC - forceful, VB - vibration, CS - contact stress, TD - task duration, WP - workplace.

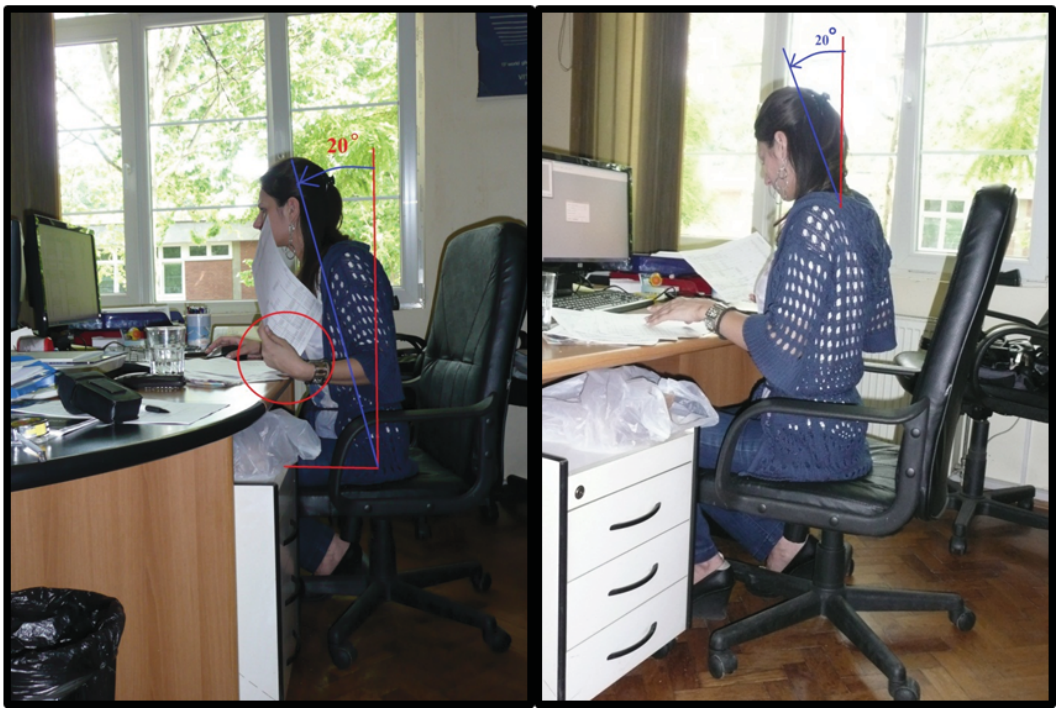

Figure 1. Typical working postures of the back and neck, for the VDT user who was positioned in the workplace number 1.

The table also shows the total scores for individual workplaces, and the average score for all five workplaces. Figure 1 shows one of the VDT workplaces within the scope of risk assessment. From the figure can be seen characteristic body angles, during the execution of usual working operation.

ANALYSIS AND DISCUSSION OF RESULTS

When observing shoulder, the highest score is achieved at workplaces number 2 and 3. Among VDT users at these workplaces, the shoulder is moderately bent, with the movements that are performed with several breaks. When considering the wrists, the highest score is noticed at the workplace number 1. Among VDT users on this workplace, the wrists are extremely bent with twisting, due to an intensive entering of texts from the paper. In relation to the back, the highest score was also recorded in the workplace number 1. For this user, the back is moderately bent forward, with repetitions of movements from 0 to 3 times per minute. Scores for the neck are the same in all subjects. It was noted a moderate bending of the neck forward, with the execution of movements with more breaks. The highest overall score of 32 has workplace number 1, indicating a medium level of risk. Other workplaces showed lower scores, but they are also located in the zone of medium level of risk.

CONCLUSION

The highest average value of the scores that was obtained using the WERA method is noticed for the wrist, and amounts to 5.2. This value indicates that the wrist was most burdened part of the body for observed VDT workplaces. Given this data, for remedying this problem, it is necessary to undertake measures in the medium-term period, with the aim of avoiding of appearance of the carpal tunnel syndrome among users over time. The overall mean value of the score for all five workplaces equals 30. The obtained value indicates a medium level of risk at the observed VDT workplaces. This means that the task can be accepted, with some improvements needed in the workplace, in terms of application of advanced design solutions and adjustments of the workplace to the user. These findings are largely congruent with the findings obtained using the comparative methods in this research.

However, WERA method has been shown some weaknesses in this preliminary study. Although from the theoretical aspect, the environment is mentioned as an option within this method, it is clear from the procedure of application of this method that only the influence of vibration is included. Other environmental factors that may have a negative impact on the human body are not covered by the WERA method. The reason is probably because in this method the primary focus is placed on effects on the muscular - skeletal system. However, it is known that VDT work is characterized by the existence of

visual fatigue, which is partly caused by the movement of the eye muscles. This effect is not treated by the WERA method. This can also be considered as a conditional deficiency, in the case of risk assessment at VDT workplaces.

Generally speaking, WERA method can be characterized as a useful tool for risk assessment in the workplaces, in conditions where the intensive dynamic activity is not performed, and when the work is not characterized by significant use of muscle forces. This method has shown a considerable sensitivity level in relation to risk assessment at VDT workplaces that were studied. In this regard, workplaces that have tested were appropriately classified according to the existing level of risk. However, it should be noted that this preliminary analysis was conducted on a relatively small sample of workplaces, which does not exclude the possibility of subsequent identification of weaknesses, which can be attributed to this method.

LITERATURE

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