

WORKING TIME ORGANIZATION AND MYOCARDIAL INFARCTION (First communication)

T. Dimitrova, A. Penev*, I. Zlatarov

Department of Hygiene and Disaster Medicine,

Prof. Paraskev Stoyanov Medical University of Varna

**Intensive Clinic of Cardiology, St. Marina University Hospital of Varna*

SUMMARY:

The purpose of the investigation is to analyze by means of hospital based case-control study the influence of working time duration in acute myocardial infarction (AMI) patients. The results demonstrate that males prevail among AMI patients in any age groups except for the group over 76 years while at the working age, 60,9% of the subjects examined are mainly physical workers (Mann-Whitney U 1633, As. Sig. 0,02). There is a statistically significant overtime workday and workweek immediately prior to hospitalization as well as a systemic pattern concerning the length of service in the group with AMI in comparison with that in the control group. Wrong working time organization with overtime workday and workweek is a correctable risk factor for a healthy status.

Key words: acute myocardial infarction, overtime work, case-control study

INTRODUCTION:

Bulgaria occupies one of the first places worldwide according to death caused by ischemic heart disease (IHD) and cerebrovascular disease (CVD). Statistical data about IHD in Europe indicate that almost 20% of males and females suffer of certain form of IHD and near 4500 Europeans die daily that means one death every 20 seconds. In addition, both direct and indirect costs for IHD amount to US\$ 500 billion. Every one per three cases of sudden death or myocardial infarction occurs in asymptomatic individuals (2). This determines the great necessity of a preventive approach and qualitative investigation of the risk factors for the disease.

Certain common tendencies of the occupational peculiarities and factors of the working environment could be examined among the cases with acute cardiovascular diseases.

It has been proved that physical activity reduces the risk of occurrence of a myocardial infarction. However, the investigations deal mainly with the physical activity at leisure while concerning the severity of work there are single and contradictory communications only. Some authors find that males working at administration offices present with a

higher relative risk with respect to cardiovascular accidents in comparison with predominantly physical workers while other ones share the opposite opinion (4, 8). Gutierrez-Fisac et al. (7) prove the absent association between work-related physical activity and body mass index (BMI) while they establish a favourable effect of regular physical exercises manifested by reduction of BMI and percentage of obesity as well.

Extra hours and overtime work are related to an increased incidence rate of work accidents and professional diseases as a whole. A large-scale epidemiological trial in the USA establishes that overtime shifts (of 12 and more hours daily and of 60 and more hours weekly, respectively) present with the highest relative risk (5). Prolonged working shifts are concretely related with an increased risk of cardiovascular diseases (10).

PURPOSE OF THE STUDY:

To assess the influence of working time duration with AMI patients.

MATERIALS AND METHODS:

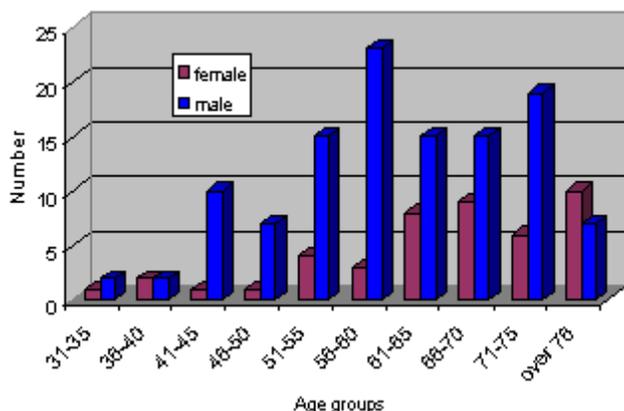
A total of 230 subjects were studied by using an inquiry investigation. Of them, 160 patients presented with a diagnosis of AMI and have been hospitalized in the Intensive Clinic of Cardiology, St. Marina University Hospital of Varna during the period between October 2004 and October 2005 (group one). The control group (group two) consisted of 70 hospitalized patients without any cardiologic history and symptoms matched according to gender and age with the group under examination. Dispersion and non-parametric analyses of SPSS-PC package were applied for statistical data processing.

The questionnaire included questions dealing with the kind of labour, organization and duration of workday during the recent month prior to the hospitalization as well as during the prevailing part of the length of service.

RESULTS:

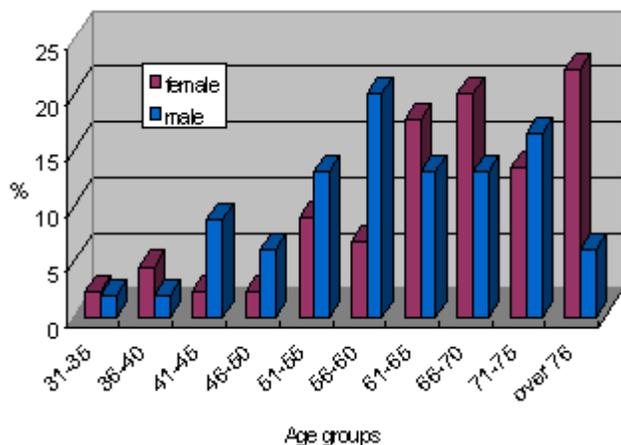
Males prevailed among the patients with AMI in any age groups except for that over 76 years (Fig. 1).

Fig. 1. AMI patients' distribution according to gender and age



The results obtained until presence demonstrated that females suffered of infarction most commonly at the age over 75 years and that between 66 and 70 years (Fig. 2).

Fig. 2. Percentage AMI patients' distribution according to gender and age



Among the respondents at working age (up to 65 years) in group one the persons executing professions with prevailing manual labour predominated (60,9%) as their number surpassed statistically significantly that one of the subjects of group two (Mann-Whitney U 1633, Sig. 0,02).

Fig. 3. Percentage persons' distribution according to the kind of profession

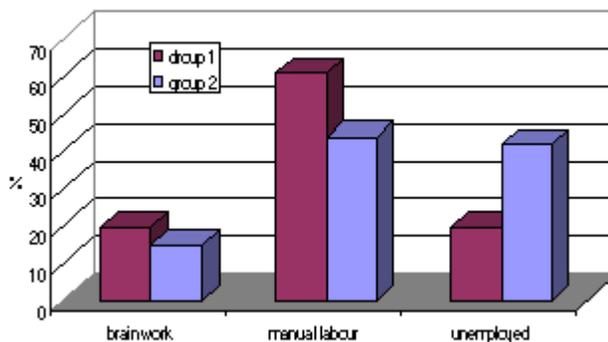
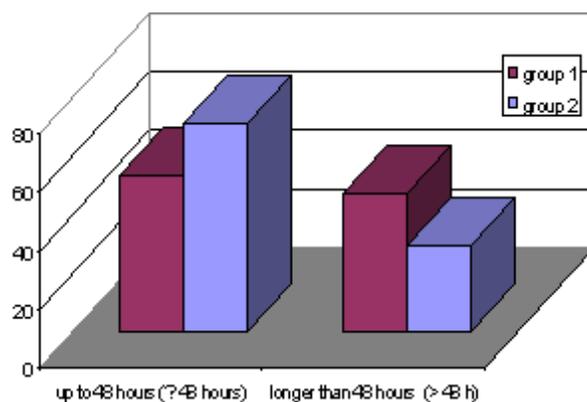


Fig. 4. Percentage persons' distribution according to workweek hours during the recent month



In the group of AMI cases the information gathered until presence demonstrated a statistically significant longer working time during the greater part of the length of service in comparison with that in the control group (ANOVA $F = 2,049$ at Sig = 0,014).

Similar statistically significant correlations were observed concerning the weekly work hours, too (Mann-Whitney U 4625 at Sig = 0,05).

Among the individuals at working age the relative share of the respondents which workweek prior to the hospitalization was longer than 48 hours in group one was statistically reliably greater than that of the persons in group two (Mann-Whitney U 1713 at Sig = 0,043). Besides there was a statistically significant difference between the group under investigation and the control group concerning the extra hours during the recent month prior to admission to hospital, too (Mann-Whitney U 1677 at Sig = 0,012).

DISCUSSION:

The statistically reliable results obtained by us concerning a greater relative share of the persons with a longer working time in the group with AMI in comparison with that in the control group correspond with the data reported by other authors, too (6, 12,13, 14).

In our group one the relative share of the workers

who were occupied longer than 48 hours weekly during the last month prior to the hospitalization is statistically significantly greater when compared with that of the control persons. A study of mortality in California, USA, reveals a prevailing IHD incidence rate among men belonging to professional groups which working time is longer than 48 hours weekly (3). According to more recent studies, there is an increased risk of IHD and AMI among workers who are occupied more than 61 and 67 hours weekly (6, 11).

Extra hours enhance the risk of AMI because of its stress-inducing effect on the exhausted organism. Exhaustion is a precursor of myocardial infarction. In most cases, this exhaustion is a consequence of disturbed adaptation capacities towards stress because of previously survived burnout, most commonly at the working place (1). The cases with cardiovascular diseases among working males in Japan belong to the group that defines itself as a longer working and exposed to higher stress at the working place in two forms, i. e. as labour tension and as subjective feeling of stress (15).

Besides stress, however, the prolonged exposition to

certain occupational harmful factors underlies the enhanced risk. Japanese investigators establish that through fatigue, the prolonged working time enhances the blood pressure while decreasing the serum cholesterol (9). A reassessment of the well-known professional risk factors for the acute cardiovascular accidents concerning their combined influence and prolonged exposition under the conditions of contemporary forms of labour is necessary.

CONCLUSION:

Incorrect working time organization consisting in prolonged workday and workweek is a risk factor for the health status. This is a specific factor of the conditions of labour which investigation provides information about the prevention of potentially reversible health problems in the working population. Extra hours should be taken into consideration as one of the correctable risk factors in AMI prevention. It is only proper that the professional groups with more than 48 working hours weekly are of particular interest during the occupational medical service.

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Address for correspondence:

Dr. Teodora Dimitrova
Department of Hygiene and Disaster Medicine
Medical University of Varna
55 Marin Drinov Str.; 9002 Varna, Bulgaria
Phone: +359/52/344521; Fax: +359/52/335301
E-mail: tvd@mnet.bg