WORK-RELATED CARDIOVASCULAR DISEASES: HYPERTENSION AND ISCHEMIC HEART DISEASE – AN OVERVIEW

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Keywords:

cardiovascular diseases, hypertension, ischemic heart disease, cardiovascular health **Abstract:** Hypertension and ischemic heart disease are work-related diseases whose production is favoured by physical or neuropsychological strain. Occupational factors can cause or contribute to strain, adding to the non-occupational factors in determining the occurrence of cardiovascular disease. Hypertension and ischemic heart disease are critical issues of healthcare, with a strong impact on health and quality of life. Concerted approach is needed for an optimal intervention with tangible results and substantive changes.

Cuvinte cheie: boli cardiovasculare, hipertensiune arterială, cardiopatie ischemică, sănătate cardiovasculară **Rezumat:** Hipertensiunea arterială și cardiopatia ischemică sunt boli legate de profesie a căror producere e favorizată de suprasolicitarea fizică sau neuropsihică. Factorii profesionali pot genera sau contribui la suprasolicitarea fizică sau neuropsihică, adăugându-se celor non-ocupaționali în determinarea apariției bolilor cardiovasculare. Hipertensiunea arterială și cardiopatia ischemică sunt probleme de importanță medicală crucială, cu puternic impact asupra sănătății și calității vieții. Este necesară o abordare concertată, în scopul unei intervenții optime, cu rezultate palpabile și modificări de substanță.

A number of factors of work organization and working conditions can contribute, with variable weight, in the genesis of cardiovascular diseases. There are numerous epidemiological arguments supporting the concept of workrelated disease, which derive from the research of associations of diseases, such as hypertension or coronary artery disease with circumstances or characteristics of the work processes.

Studies have confirmed the clear relations between the main risk factors of cardiovascular disease (diastolic blood pressure, cholesterol, smoking, body mass index, exercise) and social condition in childhood and adulthood.(1) Worker's education, occupation and income are in direct correlation with the prevalence of cardiovascular disease. Some characteristics of the work task: vigilance, responsibility for the safety of others and actions performed in dangerous situations, the increased attention focused on some devices were frequently found in the occupational history of workers included in extensive trials.(2)

The Romanian legislation in the field of occupational medicine classifies two cardiovascular diseases, hypertension and ischemic heart disease, as work-related diseases. Their occurrence is favoured by physical or psychological strain.(3) Occupational factors can cause or contribute to the overload. There are several important elements, and the first is the work organizing: work schedule length, breaks and shifts, the pace and intensity of exercise. Monotonous work, required or too strictly directed, too much responsibility felt due to the fear of mistakes with human and socio-economic consequences are all sources of mental overload.

Alternating shifts, night shifts with reversed sleepwake rhythm lead to mental strain, followed by physical exhaustion. Any pre-existing cardiovascular disease will be affected by irregular schedules. Also, the workplace organization and the factors related to the working environment (noise, lighting, and microclimate) may cause physical or psychological overload, affecting the cardiovascular system.

As important elements, psychosocial relations depend on the psychological individualities of employees and the type of approach and inter-working relations. Socio-economic factors - low wages, lack of job security, difficult or long commute, large housing and poor nutrition, hostile environment of family conflicts, working overtime to increase income or homebound work (especially for mothers and small farmland owners) play a considerable part, particularly in producing mental overload, but not limited to it.

All these will lead to an additional burden of cardiovascular disease risk factors. A number of occupational and socio-economic factors are determinants of the lifestyle the individual adopts freely or constrained, of caloric and nutritive intake which individual diet brings, and of the exercise practiced or not in the spare time. Work, with all its characteristics, can stimulate or support a healthy lifestyle or instead, it can be a disordering factor.

The World Health Organization (WHO) considers hypertension the leading cause of death by cardiovascular disease.(4) The World Hypertension League (WHL) admitted that over 50% of the hypertensive globe population was not diagnosed.(5) In fact "the silent killer" is one of the expressions hypertension is labelled with. WHL estimates the prevalence of hypertension is around the impressive figure of 1.5 billion people, which, compared to the current world population of 7 billion people, represents over 21%. Even in highly developed countries with high standard of health, such as Canada, only

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58% of the affected population is aware of suffering from hypertension.(6) Another overall estimated prevalence of hypertension, based on the analysis of studies published over a period of 22 years (1980-2002), showed a 26.4% prevalence worldwide in 2002 and 29.2% estimated prevalence for 2025.(7)

One of the issues on which WHL draws attention is the myth which continues to persist in the population that not knowing the person is affected by a disease is "a blessing". And this belief seems to perpetuate not only among the less educated population but also among people with more consistent education.(5)

Regarding prevention, based on hypertension etiology - genetic factors, obesity, lack of exercise, excessive consumption of salt, psycho-emotional factors - in association with smoking, unbalanced diet, dyslipidemia, diabetes, and occupational factors (stress, noise, vibration, exposure to lead, cadmium), action lines are relatively clear. However, primary prevention is difficult and its global results are far from showing satisfactory results. There are many barriers, from the lack or inconsistency of national programmes focused on one or more cardiovascular risk factors (for example, in Romania, there is no national programme to encourage regular exercise), poor attention on hygienic-dietary advice in routine examinations, but also in the diagnosis and follow-up of cardiovascular disease, to apparently matters of detail: food servings in restaurants, which are often oversized and have high salt content, or the significantly lower price of unhealthy foods with excess of salt and calories.

The major part of the primary, secondary and tertiary prevention, the doctor-patient relation remains one of the pillars of success in the management of hypertension, as well as of any other disease. There are numerous lines of action to be considered: the type and content of the communication, the degree of empathy achievable and achieved, the encouraging of positive steps taken by the patient, the special attention given to the different types of patients. The many characteristics of various patients must be taken into account: the cultural level, which offers a certain degree of understanding the prescription, the provenance culture, the occupation, the individual's rank in the socio-economic scale. Attracting the patient to a certain type of behavioural change - implementation of healthy behaviours can be achieved only through sustained effort and by creating a full understanding of the fact that it makes a transfer of decisionmaking power and of responsibility to the patient.(8)

According to WHO estimates from 2008, the number of deaths from ischemic heart disease (IHD) in Romania was ranked first, as compared to other causes of death and other causes of cardiovascular death.(9) The same situation is found in the developed countries - in the United States, IHD is the leading cause of overall death and accumulates half of the cardiovascular deaths.

The risk of developing coronary artery disease is also influenced by a number of factors: age, gender (more common in men), smoking, hypertension, hypercholesterolemia, diabetes. Certainly, the balance between oxygen and other nutrient supply and myocardium demand may be impacted by factors whose mechanism of action is not clarified.(10) Psychological overload occurring during work can change the equilibrium between the supply and demand ratios, and the ways in which this process occurs are also diverse. Stress translates into neuroendocrine response facilitated by the autonomic nervous system, whose intervention leads to lower heart rate variability (11), but stress can affect the hypothalamic-pituitary-adrenal axis, in association with cortisol circadian rhythm disturbances and the development of the metabolic syndrome.(12) Stress may also act indirectly by stimulating the preexisting unhealthy behaviours: smoking, physical inactivity, excessive alcohol consumption. There are studies on large populations occupationally exposed to mental overload, which led to the conclusion that the two ways described, neuroendocrine and behavioural stress, are the paths through which stress leads to IHD.(13)

Another predictor is the socioeconomic status population groups with low status have a higher risk of developing IHD, a risk persisting after the cessation of occupational activity.(14) A low economic level leads along a series of consequences, which in turn will become generators of risk: insufficient income, unhealthy diets, and low ability to cover the costs of necessary treatment. Studies showing certain occupational categories in the top IHD mortality rate hierarchy have been carried out, ranking intellectual professions (whitecollar), but also labourers (blue-collar).(15)

As it is in fact expected, alternating shifts have repercussions on the heart: there are numerous studies showing QT interval prolongation and increased cardiac events in people working in this type of schedule. Commute seems to exert a negative influence, especially in sedentary subjects who regularly use the car to go to work, unlike subjects who walk, bike or even take the bus to work.(16)

Coronary events have a second facet: the return to work of coronary patients, who often cannot be done under the same conditions as prior to the acute episode. Firstly, sustained physical activity cannot be performed with the same intensity and characteristics, but of course it all depends on the magnitude of the event and the remaining exercise tolerance. Mental load component will also have to be modified if its weight is important. Often, the intervention on patient anxiety about returning to work will have to be properly managed and it will have to receive the same attention as the drug therapy.

Of course, not only for IHD, but for all cardiovascular diseases, secondary and tertiary prevention is essential. The patient must be mobilized towards adopting a healthy lifestyle and towards eliminating or amending risk factors present before the onset of pathology: smoking, physical inactivity, high cholesterol, obesity, hypertension, diabetes. There are countries in the EU where legislation requires complex examinations (angiography to subjects who had a myocardial infarction) before returning to work stations, where the occurrence of a new cardiac event during work not only can have negative consequences, but even disastrous ones – as it is the case for pilots, drivers, policemen, firemen. In Romania, traffic and navigation safety legislation provides specific scales and requires evaluation depending on activity and type of cardiovascular damage suffered.

Cardiovascular health promotion is based not only on fighting the negative factors, but also on promoting healthy behaviours: daily physical activity, smoking abstinence, healthy diet of low glycemic load, rich in fibre cereals, folate and omega-3 fatty acids, rich in polyunsaturated fats, daily intake of half a glass of wine etc.(17)

The 2010 American Heart Association (AHA) "Defining and Setting National Goals for Cardiovascular Health Promotion and Disease Reduction: The American Heart Association's Strategic Impact Goal Through 2020 and Beyond" document notes the existence of ample evidence that promoting cardiovascular health will ultimately lead to a substantial improvement in the overall health through the prevention of many other diseases: cancer, diabetes, kidney disease, through increasing longevity, quality of life and by lowering health costs.(18)

Despite evidence of the need to support a healthy lifestyle – the backbone of cardiovascular health, many U.S. studies found that only 5% of the population can be included into the concept of ideal cardiovascular health.(19,20,21,22) Therefore, promoting a healthy behaviour and ideal cardiovascular health factors is a key objective in reducing the aggressive effect of cardiovascular diseases over the population health. Moreover, there is abundant proof that the prescription of correct medication alone will not lead to the disappearance of cardiovascular risk, but only to its diminishing. Only through objectives aiming at a healthy behaviour, goals such as substantial reduction of cardiovascular events risk, and sometimes their disappearance, can be achieved.

Undoubtedly, hypertension and ischemic heart disease are critical issues of healthcare, with a strong impact on health and quality of life. From their scale and expected trends derives their complexity, and the approach must be concerted, aiming at an optimal intervention, with tangible results and significant changes. The tools available to the occupational medical surveillance system are not only useful but essential in achieving occupational health objectives and implicitly, public health objectives: prevention, reduction and control of work-related diseases occurrence rate. They require guided management of the individual-occupation-well-being composite system. There are many areas of action, which need to be addressed gradually and in a multidisciplinary manner. Occupational physician's part is to create and coordinate the intervention plan, to implement strategies and measure their results, to act pivotally in mitigating and eliminating occupational or non-occupational factors influencing the health of the professionally active individual.

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