

HYPERTENSION IN WOMEN AS THE CONSEQUENCE OF THE WORKING ENVIRONMENT IMPACT

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Abstract. *The working environment is determined by a set of heterogeneous and dynamic factors, which accompany the performance of working activities. Regarding its structure and the intensity of its influence on people, the working environment represents a complex variable. It forms a "working climate" whose negative manifestations affect human health. Among other effects, the arterial hypertension is one of its essential consequences. The problem of high blood pressure is important for two reasons: first, due to the trend of intensive increase in the number of diseased; second, because of the complications caused by this disease.*

The objective of this paper is to point out key determinants of the working environment and models of its impact on arterial hypertension in general and specifically in women. In the female population, working environment impacts are intensified when combined with the length of service and type of job. These determinants should be taken into consideration in the process of creating the working environment and in deciding on arterial hypertension treatment.

Key words: *working environment, arterial hypertension*

INTRODUCTION

The working environment is determined by a set of heterogeneous and dynamic factors, which accompany the performance of working activities. Observed from the aspect of its structure and the intensity of its particular structural elements' influence on people, the working environment may be regarded as a variable set. The working environment nature and characteristics are revealing its high-level complexity, differentiating it from working conditions and living environment. Starting from this statement, the working environment positioning requires a system-related approach. On one side, it is manifested as a higher-order system as compared to the working conditions. On the other, it represents a subsystem of the living environment system.

In theory and practice, the working environment determinants are usually classified into physical, technical-technological and organizational factors. This set of factors, as a complex and dynamic category, forms a "working climate" whose level of adequacy varies in the range of inadequate - adequate. Inadequate "working climate", i.e. working environment, causes negative effects, among others, to the human health - both physical and mental. Not diminishing other numerous results of this effect, arterial hypertension - high blood pressure has lately been distinguished as one of its essential consequences.

The problem of high blood pressure is imposed for two reasons: first, due to the tendency of intensive growth in the number of affected; second, because of the complications that may be caused by this disease. According to research, arterial hypertension is registered as the cause of over 40% first-category disabilities. Taking into account a very low level of our health education and culture, this problem becomes more complex and its solution is more difficult. The relevance of the working environment-arterial hypertension relation in current living and working conditions has been justified by increasingly frequent research of theoreticians and practitioners in various professions, and particularly by physicians.

The aim of this paper is to point out the key determinants of the working environment and forms of its effects on arterial hypertension in general, and specifically in women, as well as to indicate the impacts of arterial hypertension on humans as biological systems - both direct and associated with other diseases.

1. WORKING ENVIRONMENT DETERMINANTS

The continuity of certain processes within a human organism is the precondition of life, of the existence of a man as a biological system, and it enables man to perform various activities. One of such activities is reflected in the process of work. However, each human activity causes different physiological or psychological changes in a man. Considering the facts that the process of work is always performed within determined time and space limits, with relevant instruments of production, in a heterogeneous organizational environment - effects of a set of organizational factors, and, finally, that the worker's environment includes certain elements of the existing social relations, it may be stated that one performs one's job in the framework of a complex of various circumstances. The set of mentioned circumstances in which working activities are carried out constitute a working environment. Accordingly, the working environment includes the following components: spatial and atmospheric interior conditions, material factors of production, internal organizational ambience and elements of the existing socio-economic conditions. The working environment, therefore, represents a specific union of heterogeneous factors in which the working process is conducted. Such conceptual definition of the working environment is different both from the working conditions and from the living environment. On one side, this concept is wider than the "working conditions" concept, as it includes other factors alongside with them. On the other side, it is narrower than the concept of living environment. However, all the three concepts represent a unity and they cannot be pitted against each other as independent. These phenomena are in an interactive relationship. These segments of human environment, in general, influence humans to a certain extent, too. First, without diminishing the significance of other segments, the impact of

the working environment appears as dominant. The working environment influences the "climate" - favorable or unfavorable, whose effects are manifested in the mental and physical conditions of workers. This further exerts positive or negative effects on humans. Apart from other consequences, hypertension has been predominating in the last years.

Two subsystems may be differentiated: living environment - the environment in which one spends one's lifetime; working environment - the environment in which one spends one's years of employment. Theory and practice offer different determinations of these subsystems. In this respect, their determinants are differently given by theoreticians and practitioners: economists, engineers, sociologists, psychologists, physicians and others.

Starting from the problem expressed in the title, the working environment shall here-with be determined as a set of circumstances in which people directly perform concrete jobs. Therefore, the working environment contains a set of different factors that may be appropriately grouped. The first group consists of physical factors: air, temperature, humidity, lighting, color, noise, vibrations etc. The second group of circumstances is related to technical-technological factors: the subject of labor, instruments of labor and the technological process itself. The third group contains organizational factors: organizational structure, organizational behavior, informal organization - informal groups, organizational culture, organizational climate [5].

1. The physical factors of working environment, as one group of factors, are manifested as unavoidable variables from the aspect of their effects on human arterial hypertension. In this aspect, the attitudes of theoreticians and practitioners are generally reconciled. This group of factors mainly affects people as biological systems through air structure, temperature and humidity, lighting, noise, vibrations, colors. The structure of air is of outstanding intensity among the physical factors. Generally, the next in the influence intensity are temperature and humidity. Noise, as a physical factor of working environment, also occupies a high position regarding its effects on humans. The impact of noise differs depending on the type of work. A high percentage of the noise influence is particularly observed in the individuals that demonstrate the symptoms of nervousness, depression, fatigue. In the set of physical factors of working environment, lighting has a significant impact, as well. Beside the lighting type, research has proved that light intensity and constancy are of substantial significance. Also, numerous studies have emphasized the importance of colors as physical factors of working environment. Different colors differently affect the nervous system, which certainly has adequate influence upon arterial hypertension, too.

2. In terms of theory and practice, the structure analysis of technical-technological factors of working environment usually enables the following differentiation: the subject of labor, machines and other instruments of labor and the technological process. The mentioned structure of factors is predominant in relation to other factors in the group. The effects of technical-technological working environment are exerted directly and indirectly on people. Beside the direct consequences, the indirect effects are observed and investigated through the physical factors of working environment. The influence of these factors is specific and their manifestations form a specific working milieu - technical working environment. In this case, there are two solutions from the aspect of workers. Fluctuation is one of the possible ways of overcoming the problem. However, the fluctuation of workers is relatively rare in contemporary socio-economic conditions. Therefore, people sub-consciously accept another solution - to remain in their workplaces. The consequence of

this is that workers become ill sooner or later. Hypertension is highly positioned in this respect.

3. In contemporary conditions of human activities, organizational factors represent one of the key groups of working environment factors. Organization is nowadays manifested as a "specific internal reserve", that is, as a "specific instrument" [5]. Its application may help in avoiding many causes of professional diseases. However, its activation requires the support of adequate knowledge, expertise, abilities and skills of the enterprise management. These preconditions are often lacking, so deviations appear in functioning of a formal organization. An informal organization is operating parallel to the formal one. The effects of the informal organization form a "stressful" working environment. Creation of such an environment is substantially contributed by the inadequacy of the organizational culture, organizational behavior, organizational climate. A logical consequence of these effects is, among others, the increase in the number of workers suffering from arterial hypertension.

It is becoming more and more obvious that the following are significant preconditions not only for successful work performance, but for the level of human mental and physical health, as well: emotions; enthusiasm; initiative; complex of personal characteristics and skills; formal and informal interactions among people; complex of values, convictions and attitudes; standards, customs and rituals; language and communication; symbols and mythology; organizational behavior. In the last few years, hypertension has been manifested as one of the consequences of certain inadequate variables of working environment. This statement should not be overlooked, as man is the most important resource and factor of success - individual, collective and social.

2. CHARACTERISTICS AND MANIFESTATIONS OF HYPERTENSION IN WOMEN - STRUCTURAL ASPECT

1. Hypertension - increased blood pressure (systolic > 140 mmHg, and diastolic > 90 mmHg) represents the disease of modern times. Its actuality has been increasingly imposed. The reason for this is the fact that the dimensions of the disease are growing. Moreover, negative consequences of the effect of high blood pressure upon humans as biological systems are increasing in number. Four stages of hypertension can be differentiated [1]. A highly normal blood pressure has recently been distinguished as a particular hypertension entity. Isolated systolic hypertension is found in 36.1%, while the diastolic hypertension is stated in 25.7% of patients. Simultaneous existence of systolic and diastolic hypertension appears in 38.2% of the cases. Literature and practice related to hypertension refer to "the rule of one half". Namely, only one half of the patients with high blood pressure are cured, which is unfavorable [4]. From this aspect, the situation gets more adverse if the results of medical treatment process are analyzed. Only half of the patients receive adequate treatment, i.e. manage to keep the blood pressure values within the physiological range.

High blood pressure affects both women and men, young or old. Generally, the frequency of hypertension is increasing alongside with the age and years of service. Nevertheless, it does not mean that it inevitably accompanies the old age. Women are protected to a certain extent by hormones - estrogens until the menopause. In this period, the risk is

by several times lower for females regarding the total cardiovascular morbidity and mortality, as compared to men. However, after the menopause, this advantage slowly degrades. Soon, within several years, the risk becomes equal in both sexes.

The marker for the disease severity is not only the pressure height, but also the duration of the disease. The following set of risk factors is significant for the generation of coronary atherosclerosis: smoking; diabetes, increased values of cholesterol and triglycerides in the blood; obesity; physical inactivity; consuming of alcoholic beverages; menopause etc. The combination of hypertension with other diseases (diabetes and damaged kidney function) and status of target organs (brain, heart, kidneys, eyes, blood vessels) affect the state of the diseased, as well. It is difficult to calculate precisely the risk of cardiovascular morbidity and mortality in the case of hypertension.

High blood pressure represents a significant risk factor for cardiovascular morbidity and mortality, with which it is in a linear relation. Hypertension is also generally associated with numerous cardiovascular diseases: cerebrovascular insult, transitory ischemic attack, angina pectoris, cardiac arrest, sudden death, congestive heart insufficiency, diseases of peripheral arteries. Therefore, adequate treatment includes associated diseases and existing disorders of target organs [3].

Hypertension is critical for other reasons, too. Above all, the possibility is disputable that the changes in blood vessels and organs would regress at a certain evolution stage of the disease. Starting from various hemo-dynamic statuses of the patients suffering from hypertension, the echo-sonography distinguishes three types of cardiac morphology changes: concentric remodeling, concentric hypertrophy and eccentric hypertrophy [2]. A less favorable prognosis for the patients suffering from arterial hypertension with the hypertrophy of left ventricular myocardium is based on the increased incidence of sudden cardiac death. It is caused by frequent ventricular arrhythmia, reduction of the coronary reserve and early disorders of diastolic and subsequently systolic functions.

The hypertrophy of left ventricular myocardium represents an early complication of arterial hypertension. The prognosis is worse for the patients suffering from arterial hypertension who developed the hypertrophy of left ventricular myocardium than for those without the hypertrophy. For this reason, one of the objectives in curing arterial hypertension is to achieve the regression of the hypertrophied left ventricle [6]. There is a minor correlation between individual blood pressure measurements and the left ventricle mass. The correlation of these parameters is more visible in the comparison with the values of blood pressure during the 24-hour monitoring. There is a substantial correlation of blood pressure variability and left ventricular hypertrophy. The blood pressure variability includes 24-hour standard deviation, increased blood pressure after physical and mental efforts, blood pressure growth in the morning and decrease during the night.

Hypertension induces a set of negative consequences that are manifested in human organism. They are related to many organs. In addition, regarding the necessity of curing it, as well as the difficulties in finding the adequate treatment, it should be tried to prevent the emergence of hypertension [1]. Therefore, prevention - primary and secondary, is indispensable. Prevention should be directed to specific aspects, by the correction of which adequate results can be achieved [7]. This refers to specific actions: correction of the way of life and behavior, adjustment of working environment. Adequate working environment factors and their influence on human physical and mental state may cause the

decrease of blood pressure values, i.e. prevent the appearance and development of hypertension in women.

Theory has emphasized and practice proved that inadequate working environment causes certain professional diseases in women. In this complex, hypertension has lately assumed one of the key positions. Arterial hypertension and its complications may induce a significant decline of human functional capacity and working ability. This relation of cause and effect represents a "vicious circle" for the affected.

The study of disability in the working population has confirmed the statement that arterial hypertension occupies a high position today. Based on the data of pension and disability funds, cardiovascular diseases caused the first-category disability in over 40% of the total number of retired persons. Among other causes, inadequate working environment is positioned high in the etiology of hypertension in women.

2. These statements have been confirmed by the results of the author's own research:

1) The research was conducted in the Institute "Niška Banja" in Niška Banja, in the course of 2001. It included 673 female persons, selected by random choice. They were classified into three groups, according to the types of work they performed: the first group consisting of 223 office employees; the second group of 215 workers; the third group of 235 housewives. Regarding the age, they were in the fourth, fifth or sixth decade of life. The age distribution did not show statistically significant differences in the examined groups.

2) The research objective was to investigate the presence and connection of increased blood pressure values with the working environment of the examined persons. Values of above 140 mm Hg for the systolic and above 90 mm Hg for the diastolic blood pressure were taken as the criteria of hypertension presence. Blood pressure was measured by the mercury manometer.

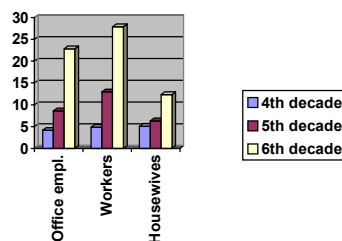
Table 1. The occurrence of hypertension in dependence of age and qualification structure of the examined women

investigated profession parameters	decade	with HT		without HT		Σ
		N	%	N	%	
female office employees	4.	2	4.17	46	95.83	48
	5.	12	8.57	128	91.43	140
	6.	8	22.86	27	77.14	35
	Σ	22	9.87	201	90.13	223
female workers	4.	2	4.88	39	95.12	41
	5.	17	12.98	114	87.02	131
	6.	12	27.91	31	72.09	43
	Σ	31	14.42	184	85.58	215
housewives	4.	3	5.08	56	94.92	59
	5.	6	6.32	89	93.68	95
	6.	10	12.35	71	87.65	81
	Σ	19	8.09	216	91.91	235
Total number of examinees		72	10.70	601	89.30	673

Source: Own research, 2001

Remarks: HT - hypertension

Chart 1. Hypertension in women - structural aspect



Source: Table 1. The occurrence of hypertension in dependence of age and qualification structure of the examined women

3) In the total examined population of 673 women working in different working environments, 72 (10.70%) of them suffered from hypertension. Out of 223 office employees, 22 (9.87%) had hypertension. In the office employees of up to 40 years of age, 4.17% had high blood pressure; the occurrence was 8.57% in the age of up to 50; and it was 22.86% in the age of up to 60 years. In the group of 215 examined workers, 31 (14.41%) had increased blood pressure (Chart 1). Hypertension occurred in 4.88% of workers in the fourth decade of life, 12.98% in the fifth, and 27.91% in the sixth decade. Out of 235 housewives included in the research, 19 (8.09%) demonstrated high blood pressure. The housewives of up to 40 years of age had hypertension in 5.08% of the cases; in the age of up to 50 years, hypertension appeared in 6.32%; in the examinees of up to 60 years, increased blood pressure was registered in 12.35% (Table 1).

4) Comparison of the existence of arterial hypertension in office employees (4.17%), workers (4.88%) and housewives (5.08%) of the age of up to 40 has not shown statistically significant differences. The analysis of the occurrence of high blood pressure in the examinees in the fifth decade of life revealed a higher percentage of hypertension in workers (12.98%) as compared to office employees (8.57%) and housewives (6.32%), but this difference was still not significant in the statistical sense. The hypertension percentage registered in the sixth-decade workers is the highest (27.91%) in comparison with the office employees (22.86%) and housewives of the same age (12.35%). In this case, the difference was statistically ($p < 0.05$) significant between housewives on one side and office employees, and particularly workers, on the other.

Physical, technical-technological and organizational factors of the working environment were manifested during the research as significant causes of arterial hypertension in women.

CONCLUSION

1. The complex of working environment factors exerts substantial influence upon getting affected by arterial hypertension. This statement is underlined by the fact that the intensity of the effects of particular groups of working environment factors is conditioned by concrete situations.

2. Considering the female population, the percentage of arterial hypertension occurrence depends on the analysis aspect. From the aspect of the age distribution, following conclusions may be given: no statistically significant differences were registered in the fourth decade; in the fifth decade, the greatest hypertension frequency was observed in the group of workers; in the sixth decade, statistically highly significant difference was registered among the individual examined groups.
3. The impact of working environment - physical, technical-technological and organizational factors, is generally more intensive in the combination with years of service and type of work. These determinants should be taken into account in the process of working environment creating and in deciding upon the arterial hypertension therapy.

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HIPERTENZIJA KOD ŽENA KAO POSLEDICA DELOVANJA RADNOG OKRUŽENJA

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Set heterogenih i dinamičkih faktora, koji prati odvijanje radne aktivnosti, determiniše radno okruženje. Sa aspekta strukture i intenziteta delovanja na ljude, radno okruženje je kompleksna varijabla. Ono formira " radnu klimu", čije negativne manifestacije utiču na čovekovo zdravlje. Pored drugih, jedna od ključnih posledica je arterijska hipertenzija. Problem povišenog krvnog pritiska je aktuelan iz dva razloga: prvo, zbog tendencije intenzivnog rasta broja obolelih; drugo, zbog komplikacija koje prouzrokuje ovo oboljenje.

Cilj ovog rada je da ukaže na: ključne determinante radnog okruženja i načine njegovog delovanja na arterijsku hipertenziju, načelno, i kod žena, konkretno. Kada je u pitanju ženska populacija, uticaj radnog okruženja je uglavnom intenzivniji u kombinaciji sa dužinom radnog staža i vrstom posla. Ove determinante treba uvažavati u procesu formiranja radnog okruženja i načina lečenja arterijske hipertenzije.

Ključne reči: *radno okruženje, arterijska hipertenzija*