

“LUCIAN BLAGA” UNIVERSITY OF SIBIU
FACULTY OF MEDICINE

OCCUPATIONAL MEDICINE RESEARCH
REGARDING THE INFLUENCE OF OCCUPATIONAL
AND NON-OCCUPATIONAL CARDIOVASCULAR RISK
FACTORS ON THE HEALTH OF THE MEDICAL STAFF
OF A COUNTY UNIVERSITY HOSPITAL

- Summary -

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INTRODUCTION

Cardiovascular disease rank first among known causes of morbidity and mortality. It is the group of disorders with the greatest progress in this hierarchy in the last half century. The motivation is complex and covers a wide range of factors. Industrialization, urbanization and globalization are the main drivers of change in the individual's life, all bringing new circumstances of life, work and diet for the entire population of the globe, but especially for the medium and high developed countries.

Healthcare workers are a particular occupational category, with its own individual and group characteristics related to its activity, and with a profile, in terms of psychological overload and morbidity, non-overlapping with any other socio-professional category. Medical work particularities relate to the permanent interaction with the patient and his illnesses, but also to the complex conditions of employment, both leaving marks on the health and influencing the wellbeing of healthcare professionals. Worker's employment environment contains a range of occupational risk factors: from biological risks (infection with hepatitis B and C viruses), to ergonomic risks (weight lifting, prolonged vicious positions), from physical risks (noise, ionizing radiation) to chemical hazards (organic solvents) and, not least, to psychosocial risks derived from occupational stress, to alternating shift work and night work, to long working hours and increased patients turnover, to interpersonal relationships with peers and managers, with patients and their families.

Research on the health of medical staff develops in parallel with the changing prevalence of diseases in the world population. With the increasing number of cardiovascular diseases and cardiovascular deaths worldwide, it becomes furthermore necessary to focus on this category of disorders occurring in healthcare workers. The target of this paper is the assessment of cardiovascular impairment of the medical staff and its purpose is to identify the level of impairment, to assess the risk of cardiovascular events and to establish a prevention program following characteristics and needs of the professional group targeted. The research results will be the starting point for further study and the support for creating and implementing of national programs aimed at the prevention and control of cardiovascular disease among healthcare professionals.

The paper is structured in 12 chapters, contains a concentration of national and international information and research findings, the scientific investigation and its conclusions. The iconography includes 77 tables, 95 figures and 3 illustrative appendices, and the references list 290 titles.

A. GENERAL OVERVIEW

Cardiovascular diseases are the leading cause of illness and death worldwide. Over 17 million people die every year for this reason, this representing 30% of all known pathological death causes (1,2). In Europe, more than 2.3 million people die of myocardial infarction and more than 1.4 million deaths are due to stroke (3).

The World Health Organization (WHO) estimates that 12.8% of all deaths worldwide are due to arterial hypertension. In turn, obesity is the annual cause of over 2.8 million deaths. Increased body mass index (BMI) is directly related to the occurrence of coronary heart disease, stroke and diabetes.

WHO estimates for 2008 (4), for an expected population of 21,486,371 people, show 59% cardiovascular deaths in Romania. Estimated prevalences are: 49.1% for hypertension (49.5% in men and 45.5% in women), 51% for overweight and 19.1% for obesity, and 47.1% for hypercholesterolemia. Over a quarter of the population smokes (27.9%) and almost 40% do not exercise.

A number of risk factors are at the origin of cardiovascular diseases. Their role has been proven by numerous large population studies (5-22). If some of the risks can be controlled by prophylaxis or medication (age, gender, and family history of cardiovascular disease), the largest category includes items that can be prevented or modified:

1. Arterial hypertension (HTN),
2. Smoking,
3. Elevated fasting glucose (diabetes)
4. Physical inactivity,
5. Overweight and obesity,

6. Hypercholesterolemia,
7. Unhealthy diet,
8. Psychosocial risks (stress).

The European Societies on Prevention of Cardiovascular Disease in Clinical Practice guidelines issued by the fifth meeting of the Joint Task Force outlines some key elements to the usefulness of estimating the total risk of cardiovascular events (CVR):

- CVR is the cumulative result of risk factors that also act in apparently healthy individuals;
- The SCORE (Systematic Coronary Risk Evaluation Project) estimation helps making treatment decisions and managing risk factors, avoiding excessive or insufficient therapy;
- Certain individuals are already in the category of high or very high risk (diabetics, class III hypertensive patients, those with familial dyslipidemia), requiring immediate action without calculating the risk,
- Women who apparently have a lower risk, actually only have a 10-year delayed CVR (23).

Occupational stress is an incongruity between the demands and pressures of work and the knowledge and skills of the worker, an antagonism that tests his ability to deal with work circumstances. In 2004, the NHLBI (National Heart, Lung and Blood Institute) Working Group that targeted cardiovascular consequences of chronic stress has published findings showing that there is an association between occupational stress and blood pressure, that studies in people with coronary artery disease or hypertension showed a positive relationship between stress reactivity and progression of these diseases, but that further research is needed to clarify the cardiovascular disease-stress relationship (24).

Healthcare workers are subject to a number of occupational risk factors, derived from work characteristics, from worker-patient interaction and from interrelationships with other members of the healthcare system.

In addition to non-occupational, primary factors (unhealthy diet, physical inactivity and smoking), the risk of developing cardiovascular diseases recognizes a number of occupational factors that may act as a co-factors in the genesis or negative progression of CVD: psychological

overload, multivalent interaction with the patient, the need for adequate reaction speeds and optimal capacity decision, the general complexity of the work and the limits of medical science.

As regards the workplace and the stress that results from its interaction with the individual, the measures which can be taken to reduce and prevent it are multiple and first require recognizing the importance of stress consequences over the entire worker-work-organization assembly.

B. PERSONAL RESEARCH

Aim and motivation of the research

The objective of the research conducted is dual: to assess the cardiovascular status of medical staff and the risk of cardiovascular disease, and to make an accurate correlation with the work characteristics.

Material

The investigational group, comprising of 300 subjects, consisted of employees of Sibiu County University Emergency Hospital. The population was divided into two groups: the first group contains 178 workers from the “hot” wards, which have high occupational exposure to stress, i.e. operating theaters of the Surgery, Gynecology, Orthopedics, Urology, Ophthalmology, ENT and Oral-Maxillofacial Surgery wards, the Intensive Care Unit (ICU) and the Emergency Unit. The second group includes 122 employees from wards with a lesser degree of stress exposure, called “cold” wards: Internal Medicine, Cardiology, Hematology and Medical Rehabilitation. The investigational group is composed of doctors, nurses, nursing assistants, caretakers and other medical staff (stretchers, physiotherapists and medical registrars).

The control group is represented by employees from a public institution (The Agency for Payments and Intervention in Agriculture - Sibiu County Center) and consists of 70 subjects: junior consultant, principal consultant, senior consultant, economist, accountant, secretary.

The average age in the investigational group was 43.61 ± 9.1 years. The average age in the control group was 48.43 ± 9.6 years. In the investigational group, 79.3% of subjects were women and 20.7% men. In the control group, 47.2% of subjects were women and 52.9% men.

Methods

- A. The first stage of the research involved the characterization of the studied units.
- B. Stage two was the comparative analyzing of health status of the target groups, focusing on the identification of cardiovascular diseases. The evaluation includes a study conducted over a period of one year (2012), in which an active identification of cardiovascular risk factors and current morbid status was completed.

SPSS Statistics 21 software was used for the statistical analysis. Charts compilation was performed both in SPSS Statistics 21 and in Excel 2010.

The studied groups were investigated in terms of:

- Clinical parameters – measurement of systolic and diastolic blood pressure (SBP and DBP), body mass index (BMI) and waist-hip ratio (RTS),
- Biologic parameters – blood levels measurement of total cholesterol (TC), HDL cholesterol (HDL-C), LDL cholesterol (LDL-C) Triglycerides (TG) and glucose,
- Paraclinical examination: electrocardiogram,
- Habitual element: smoking,
- Risk of fatal cardiovascular disease,
- Occupational factors: seniority in current profession, night work, type of occupational demand (mental, physical, mental and physical); “Stress perception” questionnaire scores (a questionnaire designed by combining (25) the emotional exhaustion (EE) subscale of the “Maslach Burnout Inventory”

(26), a scale rating burn-out syndrome, with CIS (Checklist Individual Strengths) questionnaire (27)); Work Ability Index (WAI) questionnaire score (28,29).

Results

The median age was significantly higher in the control group – at the lower limit of the sixth decade of life, which explained some of the differences found in the expression of the parameters. Gender distribution was uneven, with a significantly higher frequency of women in the investigational group ($p < 0.001$). The physicians' group gender distribution was similar to the control group, with 58.7% male subjects. The residence was predominantly urban; rural residence was significantly more present in nursing assistants and caretakers (32.3%).

Married subjects were predominant in both groups, but divorced subjects have a 6.4/1 investigational/control group ratio. “Widow” status is high in nursing assistants and caretakers (3/1 relative to the investigational group).

Basic education is mostly represented by high-school level. Vocational/professional education clearly distinguishes the investigational group, which contains almost all forms of professional and university education, compared with the control group in which university education prevails.

Male subjects in the investigational group had higher SBP (130 mmHg) than their control group counterparts (120 mmHg), $p = 0.028$. Doctors revealed a significantly higher level of SBP (median - 130 mmHg) compared to the control group (median - 120 mmHg) - $p = 0.0005$, and to nurses (median - 115 mmHg) - $p < 0.001$. Nursing assistants and caretakers showed a significantly higher level of SBP (median - 120 mmHg) compared to female subjects of the control group (median TAS - 110 mmHg).

Doctors showed a significantly higher DBP level (DBP median - 80 mmHg, mean DBP - 84.36 mmHg) than the control group (median TAD - 80 mmHg) - $p = 0.0003$. The significantly higher level of DBP was found in doctors from both wards groups and both genders. Nursing

assistants and caretakers group recorded a significantly higher DBP level (average - 81.84 mmHg) compared with women of the control group (mean DBP - 75.9 mmHg) - $p = 0.011$.

Hypertension prevalence in the two groups was: 30% in the investigational group and 37.1% in the control group. Hypertension was significantly associated with age ($p = 0.032$ in the control group and $p < 0.001$ in the investigational group) and male gender ($p = 0.035$ in the control group and $p < 0.001$ in the investigational group). Prevalence of hypertension in doctors (44.4%) was close to the WHO estimate (4) and similar to the SEPHAR results (30). In the investigational group, 27.9% of high school graduates are hypertensive, compared with 83.3% of 9th grade graduates - $p = 0.011$. In the night work category there was a statistically significant difference in the prevalence of hypertension within the occupational categories: 45.5% of doctors have hypertension, compared to 24.48% of nursing assistants and caretakers - $p = 0.016$. The independent variables that influence hypertension are “cold” wards, male gender, age, physical demand and BMI.

Doctors had significantly more electrocardiogram alterations (17.4%) than other occupational groups ($p < 0.05$). Ischemic heart disease (IHD) affected significantly more the control group ($p = 0.008$), but doctors had the highest prevalence in the investigational group (12.7%), with a percentage similar to that of the control group (14.3%).

The groups did not act differently in the overweight and obesity analysis (59.3% in the investigational group and 67.1% in the control group); overweight is significantly more prevalent in doctors (49.2%), compared to the other professions, reaching a percentage superior to that of the control group (35.7%). Obesity is more important in nursing assistants and caretakers (33.9%), with a level similar to the control group (31.5%). In the investigational group, abdominal obesity reaches 36.3%, but doctors have again a much higher percentage (57.14%).

Hypercholesterolemia, although significant in the control group (68.6%), compared with the investigational group (50%) - $p = 0.005$, had a high prevalence in physicians (57.1%) and nursing assistants and caretakers (56.9%). Median HDL-cholesterol levels were above the risk limit, in the protection zone, for both studied groups, the wards groups and occupational groups. Median LDL-cholesterol level was at risk point in the control group, in doctors, nursing

assistants and caretakers from “hot” wards. The physicians recorded the highest prevalence of hypertriglyceridemia (38.1%) and surpassed the control group (31.4%).

Glycaemia had normal average values in both groups. If control group had the highest prevalence of elevated fasting glucose (37.1%), physicians had the highest prevalence of diabetes (6.3%).

Smoking prevalence had similar levels in the two groups: 28.3% in the investigational group and 30% in the controls.

Seniority in current occupation was comparable in the studied groups and wards groups, but the nursing assistants and the caretakers have a median age (8 years) significantly lower than physicians (17 years) and nurses (15 years) - $p < 0,001$.

Night work is an exclusive feature of the investigational group, with a night work / day work ratio of 2.75 / 1.

Predominant perceived demand (mental, physical or mixed demand) was not identical in the two groups, the investigational group distinctively indicating mixed demand (84.33%). Doctors had the highest frequency of predominantly mental demand (26.98%), 3.2 times higher than nurses and 17 times higher than nursing assistants and caretakers, but much less than we expected (half of the percentage identified in the control group).

A small number of subjects in all occupational categories reached high levels of emotional exhaustion. Doctors (12.7%) and nursing assistants and caretakers (10.8%) recorded an almost double percentage than nurses and "other professions" category.

Marked prolonged fatigue is present in 9.5% of physicians compared to 1.3% of nurses - $p < 0.05$. Doctors in the “cold” wards had a higher prevalence of chronic fatigue (17.4%) than the control group (12.9%).

Average work ability index, according to the WAI questionnaire results, were in the “good” and “excellent” work ability category. The large share of women in the investigational group is the reason for placing the median WAI score in the “excellent” work ability category.

Doctors had a score of the “current work ability compared with the best personal performance” item significantly lower than nurses - $p = 0.002$.

High cardiovascular risk was present in 7.4% of physicians compared to 2% of nurses ($p < 0.001$); 81.08% of male doctors and 34.62% of female doctors were within moderate or high risk category.

The presence of cardiovascular and occupational risk factors in medical staff is far from being minor in circumstances under which our research was limited to the described determinants and to the instruments useful to their assessment and logistically available. A complete picture of risks and their effects would require addition of a number of parameters and a palette of methods of investigation covering more accurately the unexplored or only partially elucidated areas in our study, such as: quantification of exercise and alcohol consumption, diet analysis and salt consumption, measuring VLDL (very low density lipoprotein) and high sensitive C-reactive protein, oxidative stress measurement, assessment of psychological demand, of decision latitude and social support, of effort-reward imbalance and work-life balance.

CONCLUSIONS

The health of medical staff is the result of the balance between the pressure of occupational and non-occupational factors present and active in the healthcare workers population group, and their physical and mental resources. Health and safety are central targets and values in the theory and practice of occupational health.

Securing and maintaining workers health and well-being is the result of specific, concerted actions based on profound knowledge of work and occupational risks, of workers' health, of workers' relationship with work, workplace and peers. It is also based on workers' perception of all aspects of work, on reflections all these factors have on work, workers and their institution or company, seen as a structural ensemble, as economic result and socio-cultural impact.

1. We believe that work pace and intensity in the hospital is an imbalance factor for family relationships, as divorced healthcare workers are six times more numerous than the

controls. They are also significantly more frequent in “hot” wards, where work pace and intensity has the most important expression, thus requiring work reorganization measures and leisure compliance. Our study indicates a relationship between the restriction of economic resources due to the partner's death and the need for a stable job, as percentage of widows is highest in nursing assistants and caretakers (16.9%).

2. High school is the prevalent basic education level of both studied groups but the control group pursued higher education in significantly greater proportion (78.6%) compared to medical staff (35.3%). Nursing assistants and caretakers presented the lowest training level, thus the need for special training courses addressed exclusively to this group of workers.
3. We consider that higher values of systolic and diastolic blood pressure are marks of the medical profession, as doctors had significantly higher blood pressure levels compared to the control group ($p=0.0005$ for SBP, $p=0.02$ for DBP). As indicators of association with work characteristics and occupational overload, higher levels of SBP and DBP were found in doctors from both wards groups and both genders. Our study revealed as well the SBP influence of physicians' work singularity and of their dissimilar degree of professional responsibility, when compared to nurses ($p < 0.001$).
4. The demanding nature of work in the “hot” wards was, as we believe, an important factor of DBP augmenting in men ($p = 0.029$), and the loading with poorly defined tasks, along with reduced level of basic education and training and low socioeconomic status are the elements which led to a significant increase in SBP ($p = 0.002$) and DBP ($p = 0.011$) in nursing assistants and caretakers, compared to female subjects of control group.
5. We can attribute doctors' highest prevalence of hypertension (44.4%), greater than WHO estimates for Romania, at the same level found by the national study on hypertension and significantly higher than that of nurses, nursing assistant and caretakers ($p < 0.01$), to the extremely demanding nature of work and to the major differences in professional activity. We found that low level of basic education is a significant factor in the elevated frequency of hypertension in nursing assistants and caretakers ($p = 0.015$).
6. Significant negative impact of hospital occupational risks on cardiovascular disorders is also emphasized by the substantial higher probability of work in “cold” wards but not in control group to lead to the development of hypertension, with reasons found in lower

economic status of medical staff, in alternating shift work and imbalance of social support.

7. Isometric effort, basic component of physical activities in the hospital and of healthcare workers' specific physical overstrain, significantly increases the possibility of associating hypertension.
8. We believe that alternating shift work, night work, unhealthy diet and smoking habits are among the causes of the arrhythmias singularly identified in medical staff ($p = 0.003$).
9. The medical profession is a risk factor for ischemic heart disease, our study identifying the most electrocardiographic alterations and the highest prevalence of ischemic heart disease in doctors (12.7%), among all medical staff, with prevalence similar to that of the control group, and to that of the historical region to which the groups belong, as reported by a national survey.
10. The medical profession is a risk factor for overweight and abdominal obesity, psychological demands and psychosocial risk factors causing overweight to be significantly more prevalent in doctors (49.2%) compared with other healthcare workers, and with over 40% higher compared to the percentage reported by the most recent national study, also causing prevalence of abdominal obesity (57.14%) to exceed nationally identified level.
11. We bring to the forefront the co-determinant role of a factor less investigated in relation to weight gain: vocational/professional education and its reflection on stress levels, economic status and diet, respectively the more important prevalence of obesity in nursing assistants and caretakers - 33.9%, a percentage comparable to that of the control group (31.5%).
12. The cholesterolemia averages exceeded 200 mg/dl in both studied groups, but hypercholesterolemia, significantly prevalent in the control group ($p = 0.005$) was also high in physicians (57.1%) and nursing assistants and caretakers (56.9%), with percentages identical to the investigational group or even surpassing, as in doctors and nursing assistant and caretakers cases, the level reported by the last national survey.
13. Chronic fatigue score expressing pressure of occupational risk factors could be an indicator of hypercholesterolemia onset, together with the age and urban residence.

14. The weight of the medical profession's distinctive risk elements placed in increasing lipid level is proven by the highest prevalence of hypertriglyceridemia presented by physicians - 38.1%, a level that exceeds that of the last national report.
15. Male gender was the most important independent determinant, with strong expression, in the development of hypertriglyceridemia.
16. Work in collectivity and weak enforcement of the law to ban smoking in public places have led to prevalent smoking presence in women of the investigational group (26,89%), when compared to controls, and in nurses (33%), and also to a triple rate in nursing assistants and caretakers (35.9%) from "hot" wards, compared to "cold" wards, surpassing international and national estimates.
17. Our study objectified essential differences of psychological demands among medical staff, which is a mark of the professional activity of physicians, who had 3.2 times higher prevalence than nurses, and 17 times higher prevalence than nursing assistants and caretakers. Shortfall of staff in "cold" wards and subsequent tasks overload are the causes of increased mental strain in nurses. We believe that inadequate standardization of jobs and duties inconsistent with the nature of the occupation causes 3.5 times higher rate of predominantly physical strain of nursing assistants and caretakers from "cold" wards, compared to those from hot wards.
18. Psychological strain accumulated along with the increase in seniority and decreased ability to adapt to stressful situations are the elements which we believe made the "cold" wards physicians to obtain the highest prevalence of surpassing the burnout limit (26.1%) through emotional exhaustion score, higher than the control group even though, in the ensemble of the investigational group, medical staff's specific professional experience seemed to provide a better adaptation to psychosocial risks.
19. The results suggest a tendency of increase in levels of experienced fatigue, in parallel with an Increase of emotional overload perception, the medical profession in combination with work in "cold" wards constituting the factors that led to the highest level of chronic fatigue.
20. The study revealed the association of the increase in cardiovascular risk and of the hypercholesterolemia detected during investigation with the decrease in work ability,

which are elements that complete the features of a health impairment marker of the work ability.

21. Average risk score for cardiovascular events in control group was significantly higher, but closely seconded by doctors, suggesting altogether a similar impact of cardiovascular risk factors.
22. Physicians' scores of cardiovascular events risk and higher prevalence of various impairments when compared to the control group allow us to assert with certainty the major influence of occupational risk factors and their high expression in this particular category of medical professionals.

Knowledge of healthcare workers' profile, in terms of cardiovascular impairment resulted from the action of occupational and non-occupational risk factors, will be useful in medical practice and will guide the occupational medicine physician or other medical professionals when examining an employee of a hospital unit:

- ▶ General profile of the county university emergency hospital worker: woman aged 43, from urban area, married, vocational college or university graduate, most commonly a nurse, with 12 years of seniority in the profession, with alternating shift work and night work, with mixed occupational overstrain (mental and physical), excellent work ability, possibly smoking, sometimes hypertensive, overweight or obese, with a normal cholesterol level or exceeding 200 mg/dl, with low level of total cardiovascular risk.
- ▶ General profile of the physician: male or female aged 48, from urban area, married, with 17 years seniority in the profession, with on-call activity, with predominantly mental occupational overstrain, excellent work ability, nonsmoker/smoker, frequently hypertensive or with a tendency to increased BP, overweight or obese, with abdominal obesity, hypercholesterolemia, LDL-cholesterol level at risk, with possible triglycerides \geq 150 mg/d, with moderate or increased total risk of cardiovascular events.
- ▶ General profile of the nurse: woman aged 41, from urban area, married, vocational college or university graduate, with 15 years seniority in the profession, with alternating shift work and night work, with mixed occupational overstrain (mental and physical), with excellent work ability, possibly smoking, normotensive, with normal weight or overweight, with low total risk of cardiovascular events.

- ▶ General profile of the nursing assistant and caretaker: woman aged 47, from urban or rural area, married or widow, a graduate of 10 or 12 grades, who attended a vocational school, with 8 years of seniority in the current occupation, with alternating shift work and night work, with predominantly physical occupational overstrain, with good or excellent work ability, possibly smoking, normotensive but with a tendency to increased BP, overweight or obese, with abdominal obesity, hypercholesterolemia, sometimes accompanied by triglyceridemia ≥ 150 mg/dl, with low or moderate total risk of cardiovascular events.

INTERVENTION - PREVENTION PLAN

Work ability, i.e. the individual's ability to operate in accordance with job requests, is, according to the Secretary of the ICOH (International Commission on Occupational Health) Scientific Committee "Ageing and Work", Professor and Director of the Department of Physiology of FIOH (Finnish Institute of Occupational Health) and leader of the multidisciplinary team that created the concept of work ability and the Work Ability Index (WAI) method of investigation, Juhani Ilmarinen: "the most important asset of professional employees in worklife" (31). He also stated the crucial role of the employer and of the management structure in the promotion and maintenance of work ability: "Because enterprise profits are made possible by the work ability of its personnel, the enterprise has a central role in supporting and promoting the work ability of its employees".

The major purpose of the intervention-prevention plan is to promote health, work ability and well-being at work of medical staff. In the healthcare field, cardiovascular risk is caused by occupational stress, derived from type-specific interactions, with a high degree of responsibility, and augmented by certain work circumstances and characteristics which influence variously the occupations, manifesting itself especially among categories from the extremes of the hierarchical chain: doctors and nursing assistants and caretakers. Prevention of this risk involves necessarily:

- ▶ Engaging the entire hospital community in the improvement of the workforce health,
- ▶ Effective and appropriate employee informing on the total cardiovascular risk in the unit and on its effects on workers,

- ▶ Developing and encouraging by the managerial structure of a collaborative work culture, both horizontally, between hospital wards and departments, and vertically, between the basic structures and the leadership, with constant and informed involvement of workers in the decision-making process,
- ▶ Jobs standardizing, taking into account the objective realities in various hospital jobs, organizing activities specific to different occupations and establishing work tasks for each ward sector, so as to contribute to health promotion.

Overall objective is decreasing the prevalence of cardiovascular diseases in the medical staff of the hospital unit, reducing the number of cases of hypertension, IHD and arrhythmias, regardless of their etiology. Achieving the “ideal cardiovascular health” objective requires direct, controlled and repeated informing of employees on specific targets to be achieved:

- ▶ counseling on diet during work but also during leisure time, on diet components, on amount and frequency of daily meals;
- ▶ banning smoking in all hospital areas and legally sanctioning staff when noncompliant with the public policy;
- ▶ discouraging sale of fast-food or high calorie food within the hospital; offering paid hot meal to employees, at a fair price;

Long-term actions will include:

- ▶ Implementing best practice standards and procedures, and uniform use of therapy guidelines, to reduce task overloading, to avoid unnecessary operations and incorrect assignment of professional obligations, thereby reducing the psychological overstrain;
- ▶ Equilibrating the human resource-workload balance by respecting staffing standards consistent with wards and sectors specificity: employing staff;
- ▶ Providing the health unit with the medical equipment necessary to solve admitted cases, in accordance with hospital complexity and level of national rating of hospitals;
- ▶ Correct and permanent providing of the healthcare unit with individual and collective protective equipment;
- ▶ Actual defining of work tasks in job description documents and ensuring compliance; defining exceptions and emergencies;

- ▶ Balanced organization of work and rest schedules, taking into account the particular activities of each occupational category; compliance with legislation on compensatory rest and annual paid leave;
- ▶ Compliance with the physiology of organizing the alternating shift work and night work; reducing long working hours;
- ▶ Increasing staff salaries in accordance with training level and quality of services provided - finding local and self-sustained financing solutions, developing national legislative proposals or proposals for direct funding from the local community;
- ▶ Providing training and professional development programs, organized and entirely or partially supported by the healthcare unit;
- ▶ Involving employees in management decisions by consulting them directly or through trade union structures;
- ▶ Periodical (annual) consultation with the employees regarding perception of working conditions and the proposed solutions to solve problems, followed by integration of the conclusions drawn from this consultation to long-term hospital development strategy; standardized questionnaires and open-ended questions will be used;
- ▶ Managerial design and constant assertion of a positive work culture, in which medical staff are aware of individual contribution importance.

ORIGINALITY AND INNOVATIVE CONTRIBUTIONS OF THE THESIS

- This is the first Romanian study that investigated the health of medical staff, with the aim of identifying the consequences of occupational and non-occupational cardiovascular risk factors, by analyzing a complex of parameters: clinical, biological, paraclinical and habitual parameters, the total risk of cardiovascular events, night work, type of demands (mental, physical, and mixed demand), emotional exhaustion, chronic fatigue and work ability.
- The method of assessing work ability using the Work Ability Index (WAI) was implemented.
- A program for the promotion and maintenance of medical staff's work ability, in relation to cardiovascular health, was set.

- General profiles, in terms of cardiovascular impairment, of the county university emergency hospital worker, doctor, nurse, and nursing assistant and caretaker were described.

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