

ICEST 2020
**International Conference on Economic and Social Trends for Sustainability of
Modern Society**

**OCCUPATIONAL RISK FACTORS FOR CORRECTIONAL
WORKERS IN THE VOLGA FEDERAL DISTRICT**

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Abstract

The article discusses a complex of professional and social factors that negatively affect the penal system employees health. Based on questionnaires from more than 170 employees of the Federal Penitentiary Service of Russia in the Volga Federal District, the analysis of the most significant conditions and circumstances of the service was carried out in order to identify the most important predictors of the formation of chronic non-infectious diseases. The greatest violations were identified in connection with occupational stress factors: increased sensory and emotional stress, violations of the work regime in terms of occupational health. The greatest degree of responsibility for the safety of others, overtime work, irregular work changes, lack of regulated breaks are typical for security employees, medical services, safety services. In addition to occupational factors, the prison staff health is also determined by lifestyle factors. First of all, smoking (38% of workers) played a role in the formation of a high risk of hypertension in the risk assessment. The likelihood of arterial hypertension formation increases with its presence by 97%. The factors reducing the risk of arterial hypertension formation were a healthy lifestyle commitment, regular rehabilitation in sanatoria and sanatoriums, regular medical examinations.

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Keywords: Penitentiary system, correctional officers, chronic no communicable diseases, risk factors, working conditions.



1. Introduction

An extremely important place in ensuring and maintaining health is currently the identification of risk factors and conditions conducive to their occurrence. Environmental factors in combination with the biological and behavioral characteristics of a person (age, gender, social, economic status, lifestyle, etc.) have an impact on the nature and severity of the body's response to harmful factors (Rakhmanin, 2003). The nature and severity of risk factors in the environment determine the severity of the medical and environmental situation, which is the main and determining part of the sanitary and epidemiological well-being of the population (Onishchenko, 2003).

The study relevance of factors that adversely affect the health status of the penal system personnel is due to a number of reasons. It is known that in modern times the working conditions of the penal correction system employees have become much more complicated, the requirements for them have increased, and the psychological burden has increased (Bukhtoyarov et al., 2017). This is primarily due to the deterioration of the criminogenic characteristics of convicts, an increase in the number of persons with mental disabilities, and secondly, to a change in the criteria for evaluating the activities of employees during the reform of the penitentiary system in accordance with the Concept for the Development of the Penitentiary System of the Russian Federation until 2020. These factors determine the need for constant monitoring of Penitentiary System employees over their behavior, feelings, emotions to prevent assimilation with a criminal-oriented environment in work processes and to avoid person professional deformation (Nagornykh, 2003; Ostapenko, 2012). A high level of psychoemotional tension, adverse conditions of service, and contact with marginal elements of society increase the likelihood of premature burnout, emotional exhaustion of employees, which ultimately leads to an increase in the risk of various diseases in the staff of the Penitentiary system (Burt, 2016). As a result, there are frequent cases of temporary disability, premature retirement due to illness, and even suicides and cases of premature death of employees of the penal system (Burt, 2015).

According to data from both domestic and foreign authors, occupational stress is assigned the role of one of the main reasons for drinking alcohol and smoking tobacco among employees of Ministry of the Interior (King & Smith, 2004; Perrine et al., 2004; Potapov & Sokolov, 2016). Some employees have stress without experiencing the direct impact of extreme factors. Violations are manifested at the psychological level in the lowered mood, increased anxiety, aggressiveness, deterioration of service indicators, alcohol abuse, intra-family and interpersonal conflicts (Terentyev, 2012). Excessive coffee, tobacco and alcohol, and other risk factors for developing chronic noncommunicable diseases are prevalent among more than 50% of law enforcement officials (Golenkov & Kurakina, 2013).

The global burden of noncommunicable diseases is a serious public health problem that undermines social and economic development worldwide. Reducing this threat requires urgent action at the global, regional and national levels (Global action plan for the prevention and control of noncommunicable diseases 2013-2020, 2013). Scientific evidence shows that with the effective implementation of existing cost-effective preventive and therapeutic interventions and maintaining a balance between them, the burden of noncommunicable diseases can be significantly reduced. At the same time, the experience of most countries of the world has shown that impacts over 10 years aimed at reducing the prevalence of these risk

factors determine an average mortality reduction of 55% (Boytsov, Gambaryan & Vylegzhanin, et al., 2013).

2. Problem Statement

Thus, there is a contradiction between the influence of risk factors due to lifestyle and the conditions of service of an employee of the penal system.

3. Research Questions

In our study, it was necessary to find out what specific risk factors for noncommunicable diseases are detected among employees, as well as what production factors affect the formation of noncommunicable diseases in correctional institutions, and assess the degree of influence of these factors on the development of arterial hypertension.

4. Purpose of the Study

Purpose of the study is to study of the influence of service conditions and direct risk factors of chronic non-communicable diseases of correctional facility employees on their health status.

5. Research Methods

In the present study, 171 people were enrolled: 102 men and 69 women. The employees of the penitentiary system were selected by random sampling from various establishments located on the territory of the Volga Federal District. Information was collected in the Perm region, in the Udmurt Republic and the Federal Penitentiary Institution of Higher Professional Education Perm Institute of the Federal Penitentiary Service of Russia (advanced training faculty), where employees from various territories of the Volga Federal District are trained. The questionnaire was conducted anonymously; when filling out the questionnaire, respondents had to indicate only the gender and the corresponding service of the penal system from personal information.

Questionnaire questions are grouped according to the main criteria of the severity and intensity of the service process, as well as the commitment of employees to a healthy lifestyle and medical care. The questions of the questionnaire contained criteria for assessing working conditions in accordance with the order of the Ministry of Labor and Social Protection of the Russian Federation dated January 24, 2014 No. 33n «On approval of the Methodology for conducting a special assessment of working conditions, the Classifier of harmful and (or) hazardous production factors, and the report form special assessment of working conditions and instructions for its completion» and the Guidelines for the hygienic assessment of factors of the working environment and the labor process.

According to age groups, the distribution was as follows: 20-29 years old - 20.46%, 30-39 years old - 46.20%, 40-45 years old - 25.15%, over 45 years old - 7.6%. Thus, the most common age of respondents was an average age of 30 to 40 years. When assessing the length of service in the penitentiary system, there was not a single respondent with a work experience of less than 1 year, with a work experience of 1 year to

5 years - 12.28%, with a work experience of 5 to 10 years - 32.75%, with work experience of more than 10 years - 54.97%.

According to service groups, we divided employees into 4 groups: security department (n = 63), safety department (n = 33), medical service (n = 41) and other services (n = 34). The group of other services included representatives of educational and psychological departments, personnel divisions, accounting, information and technical support, and others.

According to the criterion for the arterial hypertension, obtained according to the medical examination of employees, we divided the employees into two groups: the observation group (with signs of arterial hypertension) n = 83 and the comparison group (employees without signs of arterial hypertension) n = 86. To calculate special risk indicators, methods for calculating relative and attributive risk were used (Zaitsev et al., 2006).

6. Findings

When assessing microclimatic service conditions, it was found that more than 38% of employees work outdoors or in a cooling microclimate, 8.77% in a heating microclimate. A significant part of the employees of the safety and security departments serves in the open air or in a cooling microclimate (48.48% and 58.73%, respectively, $p < 0.05$). Service in the conditions of a heating microclimate to a greater extent in comparison with other services is typical for employees of the security department (12.70%) in connection with service in the open air ($p < 0.05$). The service of more than 18% of employees, according to them, involves working with harmful chemicals or dust. Employees of the medical service (51.22%, $p < 0.001$) are significantly more likely to notice the effects of harmful chemicals and dust, employees of the security departments and other services are relatively less (12.12% and 11.76%, respectively, $p < 0.05$).

With a subjective assessment of the work severity, about 7% of respondents noted lifting and moving weights, 23.98% of employees - physical dynamic load, 45.03% - long-term work in a standing position, 39.77% - stereotyped labor movements. Weight-lifting in their daily activities is primarily noted by medical service employees (12.2%, $p < 0.05$). Physical dynamic load is noted in the daily service of the security departments (31.75%, $p < 0.001$), a little less often this factor affects the employees of the medical service and safety departments (24.39% and 24.24% correspondently, $p < 0.05$) and practically not observed in the work of other departments (8.82%). Long-term static load on the spine in a standing position is typical for employees of the medical service (53.67%), employees of the safety department (48.48%), security department (46.03%) and a little less - for employees of other departments - 29.41% ($p < 0.05$). The presence of stereotypical labor movements in their daily service is noted by 46.34% of medical service employees, 42.42% of safety department employees, and 36% of security and other service employees each ($p < 0.05$).

When assessing the labor intensity of the employees of the penitentiary system, we separately evaluated the blocks of sensory and emotional stress, monotony, and mode of work. When assessing the factors of sensory load, 22.22% of employees noted monitoring of the monitor (more than 176 signals or messages per hour), 32.16% - simultaneously monitoring 11 or more objects in their activity, 22.81% experience a load on the voice device of more than 25 hours a week, more than 7% report working with optical devices and a screen for more than 50% of the working time. According to the factor of sensory

load, “monitor tracking” is slightly less than the burden of the medical service (14.63%, $p < 0.05$), in other services - about a quarter of employees positively note this factor. Simultaneous monitoring of objects is typical for the security department - about 50% of them noted this factor and 36.36% of the safety department employees ($p < 0.05$). Other types of sensory load did not prevail in a particular service ($p > 0.05$).

When assessing the emotional load on the factor of a high degree of responsibility for the results of one's own activity, they were equally noted in all services, however, most of all - in the medical service (78.05%, $p < 0.05$). The high risk for one's own life is significantly higher in the group of medical workers - 63.41%, in other services the risk was 33.33% in the safety service, 23.81% in the security departments and 14.71% in other services. The greatest degree of responsibility for the safety of others is inherent to employees of the safety department (60.61%), the medical service (56.10%), the security department (44.44%), and to a lesser extent other services - 26.47%. The largest number of conflict situations per shift was noted by about a quarter of employees of medical departments (24.39%). Further, in the order of reduction, 18.18% of employees of the safety department, 15.87% of employees of the security department and 11.76% of employees of other services.

In terms of labor monotony, the proportion of respondents who answered positively was 43.86%. The labor monotony is noted by all groups of employees approximately equally (from 41.27% to 47.06%, $p > 0.05$). When analyzing the daily regimen, the largest number of positive answers related to the parameter: a working day more than 12 hours a day and irregular working hours - 40.94% each. Over 39% report overtime work. More than 35% of respondents report a lack or absence of regulated breaks during the working day. The most difficult work schedule was noted by employees of the security and safety departments (63.49% and 66.67%, respectively, $p < 0.001$). In other units, the daily regimen violations were about 10%. Irregular shift work was noted to a greater extent among the employees of safety departments (36.36%), employees of security departments 33.33%, about a quarter of medical service employees and 5.88% of employees of other services. The insufficiency or absence of regulated breaks during working hours is primarily characteristic of employees of the safety department (48.48%) and, to a lesser extent, of employees of the medical service (24.39%). Overtime is typical primarily for security departments (50.79%) and safety departments (45.45%, $p < 0.05$). An irregular working day is also more characteristic of security departments (47.62%, $p < 0.05$).

A separate question concerned the number of hours for military training per week: the average value was 2.18 ± 0.16 hours. In the medical service, this indicator was 1.71 ± 0.21 hours, in other departments 1.98 ± 0.32 , in the safety departments - 2.08 ± 0.35 hours, and in the security departments - 2.63 ± 0.33 hours ($p > 0.05$).

The study of the parameters of the lifestyle of employees and social risk factors showed that the employees of the penitentiary system evaluate their lifestyle as follows: the largest part of the staff (43.86%) say that they moderate the diet, work and rest, sometimes go in for sports as much as possible, with another equivalent part of the staff (42, 11%) there is no way to observe the diet, labor and rest and play sports, while at the same time only 10.53% fully comply with the diet. Thus, in the aggregate, more than half of employees still try to adhere to a healthy lifestyle and nutrition.

Full observance of the diet, labor and rest, regular exercise is noted by only 20% of medical service employees ($p < 0.001$). Among other services, adherents of a healthy lifestyle are much fewer: 11.76% among other services, 9.52% among security services. And among the employees of the safety department there are none at all.

Moderate adherence to diet, work and rest, sometimes as far as possible - sports are also noted primarily by medical personnel (53.66%, $p < 0.05$). They are followed by employees of the security service (46.03%), employees of other services (38.24%) and only then employees of the safety departments (33.33%). The inability to maintain a healthy lifestyle is mostly noted by employees of the safety department (63.64%, $p < 0.05$), 44.12% of employees of other services, 41.27% of employees of security departments and 24.39% of employees of the medical service.

If we pay attention to the factors that impede the commitment to a healthy lifestyle, then the employees noted the lack of free time as the main negative factor, the service schedule is in second place, and then other reasons do not play such a significant role, such as: lack of information about healthy lifestyle, unwillingness and disbelief in the success of the event, the presence of ingrained bad habits. As follows from the analysis, respondents chose more than one answer option.

The main obstacle to adherence to a healthy lifestyle, according to most employees, is the lack of free time. This was answered by 68.29% of employees of medical departments, 58.73% of employees of the security department, 50% of employees of other services, with the exception of employees of safety departments: more than 60% of them preferred the service schedule as the main obstacle. Statistically significant differences were confirmed in relation to safety officers, who noted that they were prevented from leading a healthy lifestyle, especially rooted bad habits (15.15%).

When analyzing the existing risk factors for noncommunicable diseases, employees obtained satisfactory results. As can be seen from the figure, only about a quarter of the personnel are exposed to bad habits (28.66%).

Safety officers are most susceptible to bad habits. So, 6.06% noted that they often abuse alcohol and smoke when they are stressed, 39.39% moderate drink alcohol and smoke, which in general makes up about half of the safety department. Approximately a quarter of the security and other services department employees indicated that they drink moderately and smoke. While more than 60% of medical workers do not smoke, and about 25% drink alcohol mainly on holidays. The proportion of healthcare providers who use alcohol was approximately 15% ($p < 0.001$).

A more detailed analysis of tobacco adherence noted that 37.43%, that is, more than a third of employees, are addicted. The most common answer was: "I smoke up to 1 pack of cigarettes a day" (20.47%), some employees (10.53%) smoke periodically, several times a week. Most of the employees do not smoke - 61.4%.

When analyzing various services, it was noted that tobacco smoking also prevailed among employees of the safety department: 6.06% admitted that they smoke more than 1 pack of cigarettes per day, up to 1 pack of cigarettes smoke 30.30%, 27.27% of employees smoke periodically, only 36.36% of employees do not smoke. The situation with security officers is slightly better: they do not smoke 57.14%, smoke more than 1 pack of cigarettes a day, 1.59%, less than 1 pack of cigarettes 26.98%, about 10% of

employees smoke periodically, 4.76% occasionally. Among the employees of medical departments, 85.37% do not smoke, and no one smokes more than 1 pack of cigarettes.

The presence of such a risk factor for the chronic non-infectious diseases development as an increase in blood pressure is one of the decisive factors in the diagnosis - arterial hypertension. An episodic or systematic increase in blood pressure was also the subject of a survey. Thus, a third of employees have an episodic increase in blood pressure, 15% have a constant increase, approximately the same number of employees did not pay attention to an increase in blood pressure. A third of employees do not suffer from this ailment.

A constant increase in blood pressure during the working day was noted by 27.27% of employees of the safety departments, 15.87% of employees of the security department and about the same number of employees of other services (14.71%). 41.46% of employees of medical departments and 41.17% of other services, 36.36% of employees of the safety department and 23.81% of employees of the security department noted an occasional increase in blood pressure. A total of 63.64% of the employees of the safety department are prone to hypertension, the second place for this factor is the employees of other services - 55.88%, the third place is taken by the employees of the health department (43.89%). In fourth place, employees of the security department - 39.68%. More than 50% of medical workers, 31.75% of employees of the security department and about a quarter of the employees of the safety department and other services did not note an increase in blood pressure. They noted that 27% of security guards did not notice an increase in blood pressure during the working day.

An analysis of eating habits indicates that more than half of the employees report an inadequate intake of fruits and vegetables in their diets, and approximately 20% of employees report an excessive intake of salt, as well as fats and carbohydrates. Among food habits, excessive salt intake (salting up, frequent use of salinity, smoked products) is noted to a greater extent by employees of the safety departments (30.30%, $p < 0.001$). Excessive intake of fats and carbohydrates is noted to a greater extent by employees of the security and safety departments (23.81% and 21.21%, respectively, $p < 0.05$). However, each of the services to a greater extent (more than 50% each) notes a lack of fiber in nutrition.

Only 15% of respondents note low physical activity, that is, this risk factor is not so characteristic for employees of the penitentiary system.

Among the factors of the working environment, factors of labor tension are crucial for the formation of arterial hypertension: the presence of sensory burden, violation of the work regime and the monotony of the labor process: thus, the monotony of labor increases the risk of developing hypertension among employees of the penitentiary system by 37%, sensory burden by 39 or more %, and the presence of 4 or more conflict situations per shift increases the risk by 66%. Abnormal night work and irregular work hours increase the risk of hypertension by 43 and 44%, respectively.

According to our data, the risk of developing hypertension increases by 79% in the presence of a factor that reduces the socio-economic standard of living.

In addition to production and socio-economic factors, the decisive predictors can be the employee's lifestyle factors. The inability to maintain a healthy lifestyle increases the risk by 53%, and smoking more than 1 pack of cigarettes per day - by 97%. Any rate of smoking in general can increase the risk of developing hypertension by 42%.

Excessive salt intake and low medical compliance can also affect the risk of developing hypertension. So, excess salt intake increases the risk of developing hypertension by 68%, and reluctance to follow the doctor's recommendations - 58%.

Low adherence to organized rest during the next vacation also affects the risk of developing hypertension - it increases by 39%, however, this indicator did not exceed the confidence threshold.

If we talk about factors that positively affect the reduction in the risk of arterial hypertension, then this is, first of all, full compliance with the regime of work, rest and nutrition. The contribution of this factor to reducing the risk of hypertension was 70%, that is, the risk of hypertension in the presence of this factor is reduced by 70%. No less significant factor was a positive assessment of the respondents rest in departmental sanatoriums. In the presence of this factor, attributive risk was 84%, which also helps to reduce the risk of hypertension. In parallel with him, another significant factor was registered: regular recovery in sanatoriums - the risk of hypertension with him decreased by 57%. Another factor was important: the commitment of employees to undergo periodic medical examinations. The presence of this factor contributed to a 51% reduction in the risk of hypertension.

7. Conclusion

Thus, when analyzing the impact of factors of the working environment, the greatest violations were found in relation to factors of labor stress: high sensory and emotional stress, violation of the work regime in terms of labor hygiene. Such deviations are most pronounced among the employees of the security and safety departments: about 50% of the employees of the security department and 36.36% of the employees of the security department note a high sensory load ($p < 0.05$), the greatest degree of responsibility for the safety of other persons is characteristic of employees of the security and security departments (60.61%), medical service (56.10%), security department (44.44%) ($p < 0.05$), overtime work, irregular shift of work, absence of regulated breaks during working hours are characteristic first of all for security departments (50.79%) and the security department (45.45%, $p < 0.05$).

In addition to production factors, the health of personnel of the penitentiary system is also determined by factors characterizing the lifestyle of employees. First of all, this is smoking, which affects 38% of employees. Among them, the employees of the security departments are most committed to smoking (63.64%). The same factor played a role in the formation of a high risk of hypertension. The likelihood of hypertension developing increases with its presence by 97%, the informativeness of the factor was 0.4 ($p < 0.05$).

The factors that positively affect the risk of developing hypertension were a commitment to a healthy lifestyle (AR = -70.40%), regular rehabilitation in sanatoriums and health centers of the Federal Penitentiary Service and the Ministry of Internal Affairs of Russia (AR = -84.06%), regular medical examinations inspections (AR = -51.65%).

Acknowledgments

This work was carried out in accordance with the research plan of the Federal Penitentiary Service of Russia.

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