Reducing the occurrence of occupational diseases in order to make the work of mining personnel more efficient

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Abstract. The objectives of the study focus on identifying the professional working conditions and the implementation of labor protection regulations in the mining field; identifying occupational diseases in the mining industry; identifying how these occupational diseases have been treated through various therapeutic forms. Through the questionnaire-based survey, we collected both objective data (age, gender, marital status, etc.) and subjective data (opinions, aspirations, attitudes, beliefs, needs, etc.), considering this method appropriate for identifying and describing the aspects targeted by the research. The questionnaire was administered to a group of individuals with various levels of training (engineers, mining rescuers, miners, etc.) who work underground in harsh conditions, within mining enterprises in the Jiu Valley, Hunedoara County. It consisted of 22 questions structured around 4 important dimensions of analysis: professional data, conditions related to the workplace and the implementation of labor protection regulations, aspects related to occupational diseases in the mining industry, and personal data. The analyzed topic is important in the real world as the number of studies in this field is quite limited. The paper will also highlight and graphically present the results obtained from the subjects.

1 Introduction

Various specialized studies highlight the fact that health promotion programs can help prevent illnesses or accidents at work. However, in many industries only a very small number of organizations plan to effectively implement, monitor and review risk management processes, and the focus has been on the management of serious workplace accidents rather than emphasize the prevention of work accidents. Various specialized studies highlight the fact that health promotion programs can help prevent illnesses or accidents at work. However, in many industries only a very small number of organizations

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plan to effectively implement, monitor and review risk management processes, and the focus has been on the management of serious workplace accidents rather than emphasize the prevention of work accidents.

There is relatively little evidence regarding the effectiveness and cost-effectiveness of the harms caused by these prevention programs. There is an opportunity to develop a more holistic approach to the gym by miners as a component of the health surveillance program. This begins with the selection of miners following a medical examination followed by physical exercise programs that are closely related to the effort at work, that allow the development of endurance, resistance to aerobic exercise and increase muscle mass, the program designed to match the physical demands of mining and to maintain and increase the physical condition of miners, leading to a decrease in workplace safety and an increase in the body's resistance to work-related and occupational diseases. [6,7]

The increase in competition has led to significant changes in most businesses in the world of industry, stimulating efforts to reduce costs and increase work efficiency. This has a great influence on the workforce, on changing the schedule at the workplace, reducing the number of employees, all of which have a resounding impact on the family life but also on the worker's health. Maintaining health at work is important, but unfortunately the lack of funds to cover the costs of miners' physical health problems is a major problem that leads to a decrease in their work capacity and implicitly to a decrease in work efficiency. [8]

2 The research methods used were survey based on questionnaire and interview

All this was achieved by combining the collection of quantitative and qualitative data proposing to identify objective data from social reality. The objectives of the study are focused on the identification of the professional working conditions and the application of labor protection rules in the mining field; identification of occupational diseases in the field of activity of mining; identifying how these occupational diseases were treated through various therapeutic forms based on physical exercises. Through these recommendations, the research has an innovative contribution in the targeted field.

*Through the questionnaire-based survey*, we collected both objective data (age, sex, family status, etc.) and subjective data (opinions, aspirations, attitudes, beliefs, needs, etc.) considering this method opportune for identifying and describing the aspects targeted by the research.

The questionnaire is one of opinions, targeting not only the opinions, but also the aspirations, needs and values, attitudes and interests of the mining personnel who work underground. [1]

The questionnaire was applied to a group of 100 people with various forms of training (engineers, mine rescuers, miners, etc.) who work underground in difficult working conditions, within the mining enterprises in Valea Jiului, Hunedoara county.

The topic analyzed is important in the real world as the number of studies in this field is quite limited. There is relatively little evidence regarding the effectiveness and cost-effectiveness of the harms caused by these prevention programs. In the analysis of the questionnaires, the relationship between the professional working conditions, the application of labor protection rules in the mining field and their correlation with the occupational diseases in the field of mining activity and the way to reduce/eradicate them in order to make work more efficient was followed.

Regarding the content of the questionnaire, it consisted of 23 questions structured on the basis of 4 important analysis dimensions: I. Professional data - 5 questions; II. Conditions
related to the workplace and the application of labor protection rules - 6 questions; III. Aspects related to occupational diseases in the field of activity of mining - 8 questions; V. Personal data - 3 questions.

Before applying the questionnaire, the subjects were made aware of the need for their evaluation, the importance of personal opinions related to the characteristics of the workplace, the importance of knowing their opinion regarding the importance of physical preparation of an organism to be able to cope with the effort made underground, but also the importance of issuing some honest opinions about the need to improve mining equipment.

In the analysis of the questionnaires, the relationship between professional working conditions, the application of labor protection rules in the mining field and their correlation with occupational diseases in the field of mining activity and the way to reduce/eradicate them in order to make work more efficient was followed.

The first research hypothesis "The higher the incidence of occupational diseases of mining personnel working underground, the lower their work performance and the higher the risk of occupational accidents" was verified through the second dimension of analysis, being confirmed partial. [2]

The second research hypothesis "The more the labor protection rules are correctly learned by the workers and the training at the workplace is correctly applied, the less the occurrence of accidents at the workplace" was verified by the first and second dimensions analysis, this hypothesis being confirmed.

The third hypothesis "If there were and would be applied certain physical exercises adapted to the personalized needs of mining personnel affected by occupational diseases specific to the mining work field, then the chance of their reduction, prevention and recovery and implicitly of work efficiency would increase considerably" was verified by the third dimension of analysis, the hypothesis being confirmed.

As can be seen, there are several professional categories targeted by this research, with higher education or with secondary education, the questionnaire being addressed to respondents from several occupation categories, precisely to highlight the fact that work in the mine affects all categories of workers regardless of the degree they occupy in the professional hierarchy. [3]
Regarding the educational level of the respondents, to the question "What is the level of the last completed studies?". Figure 1 highlights that most of the people investigated have secondary education (61.53% of people), of which the highest share is the respondents with compulsory secondary education of ten classes (33.33%), and only 38.45% of the respondents have education post-secondary, university or post-university. Regarding the experience in the mining field, the vast majority of the people investigated (87.18%) have long experience in the underground mining field of over 20 years and only 10.25% of the respondents have a reduced seniority in the field of work between 5-10 years, this fact being explained by the fact that the mining segment was restructured, in the Valea Jiului area, and that during the contemporary period of economic crisis, no more hires were made. Figure 2 reflects in detail the seniority in the mining (underground) field of the respondents. [4]

![Fig 2. Age of respondents in the field of mining - underground](image)

Regarding professional qualification or retraining, the majority of respondents (92.00%) gave importance to professional improvement by attending professional qualification or retraining courses during their professional experiences, and only 8.00% of respondents did not attend qualification or professional retraining courses. professional retraining, which inoculates the idea that in general the respondents have professional concerns that can contribute to the efficiency of the work they perform.

![Fig. 3. The level of professional qualification or retraining courses](image)
To the question "How do you consider the working conditions in the environment in which you carry out your activity?" the majority of respondents (80.00%) consider the working conditions to be satisfactory, 5% of the respondents considering the working conditions to be "good", and interestingly also 5% of the respondents considering the working conditions to be "very bad", 7% considering them "bad" only 3% thinking they are "very good". [5]

![Graph](image)

**Fig 4.** Respondents' perception of working conditions in mining (number)

Even if in the previous question regarding the respondents' perception of the working conditions in mining, most of the respondents had a positive perception on this aspect declaring themselves satisfied with the working conditions, 92.31% of the respondents think that the working conditions could be improved work in the field of activity.

Regarding the aspects that could be improved, the respondents believe that there are several postures that need to be perfected in the field of mining activity. From the answers of the respondents, the work equipment is highlighted; work methods and procedures by correlating topics with job descriptions and risk assessments, by presenting workers with "what they know", not "what they don't know"; retechnology; more staff; the need for new equipment; the access ways from one point to another; gauge of railway lines; quality materials; higher galleries; the introduction of more efficient supporting elements; salary; better working conditions; way of working; rescue devices; working tools and machinery used in mining; respect for mining personnel, a high number of respondents (97 people) believing that greater importance should be given to investments in the purchase of equipment; and three other people considered that reducing physical effort is an important component in improving working conditions. [8,9]
92.31% of the people investigated consider training at the workplace useful as an essential condition in preventing accidents at the workplace, and 7.69% of the respondents not considering it important. Also, the same number of respondents (92 people) believes that the training carried out by the competent persons and the labor protection rules learned were useful in a dangerous situation at the workplace. Among the most important aspects of real use in a dangerous situation, mentioned by the investigated persons were stated: the correct wearing of work protective clothing (60 respondents); training and physical condition appropriately dosed according to the risk situation (47 people) and correct handling of masses (transport, support, lifting, handling objects with risk for workers) (46 people).

3 Conclusions

In conclusion, maintaining health at work is important, but unfortunately the lack of funds to cover the costs of miners' physical health problems is a major problem that leads to a decrease in their work capacity and implicitly to a decrease in work efficiency. The paper highlights the importance of working capacity in mining. Starting from the specialized literature and from the results of our own research regarding health at work and survival in the mining industry, sets of specific exercises will be designed, developed and structured for the eradication/reduction of occupational diseases leading, implicitly, to increasing the capacity of work and keeping the body healthy. They must meet the requirements of health and safety regulations at work, and with the maintenance of long-term health.

An important thing in defining the physical exercise at work is the verification of the actual state of the miner's physical condition, something that is underappreciated or neglected in our country. From the point of view of mining history, it is known that the underground work of hired personnel imposes heavy physical demands on the miners and not everyone is suitable to perform this hard work from the physical and mental point of view. Carefully researching the working conditions, the protective equipment and all the influencing factors, it turns out that the most important and cheap way to prevent diseases,
to recover from accidents is physical exercise itself, which if used correctly leads to an increase in work efficiency.

References