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COMMON WORK-RELATED DISEASES AMONG CONSTRUCTION WORKERS

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Abstract The construction industry is one of the most dangerous sectors of economy. According to the International Labor Organization up to 60 000 fatal work injuries occur annually on construction sites all over the world. The main adverse factors affecting the construction workers are increased levels of noise and vibration, dust and fumes in the air in the working area, unfavorable microclimatic conditions, chemical factors, as well as the severity and intensity of the labor process. These factors are related to many diseases among workers.

Keywords: Construction workers; work-related diseases; work-related accidents; work-related hazards.

1. INTRODUCTION

Construction sites are inherently hazardous environments where effective safety communication is crucial for preventing accidents and injuries [1]. The construction sector is one of the most dangerous industries globally, consistently recording high rates of accidents and fatalities. According to the International Labour Organization (ILO, 2022), construction accounts for approximately 7% of global employment but nearly 30% of workplace fatalities. These numbers highlight the inherent dangers workers face due to factors, such as working at heights, heavy machinery, complex work environments, and adverse weather conditions [2]. Considering the complexity and time constraints of construction projects, all construction job sites require safety orientation and training, which places additional responsibility on workers to ensure requisite capacity building within a short time and simultaneously complying with the rules and regulations during the designing, planning, and execution of tasks [3,4].

Construction is one of the highest risky jobs for accident-related fatalities and injuries globally. Since construction workers are often exposed to multiple physical risk factors (such as awkward posture, vibration, kneeling, contact stress, environmental risk, static force, prolonged standing, sitting, bending, twisting, as well as carrying and lifting heavy objects [5-7]. The National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) have made recommendations for general ergonomic practices to reduce risk exposures associated with various WRMSDs, and to minimize the impact of occupational hazards on the development of WRMSDs in construction workers [8].

Early evaluation/identification of potential physical risk factors for WRMSDs has been recommended at the construction planning stage [9], while some strategies (such as prevention

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through design) are suggested to minimize physical exposures that may lead to WRMSDs in construction workers [10]. However, since different construction trades may have different physical risks, it is necessary to identify trade-specific physical risk factors to develop tailored occupational guidelines. Construction workers (CWs) are positioned at the lowest level of an organization and thus have limited control over their work. For this reason, they are often deprived of their due rewards and training or sometimes are even compelled to focus on production at the expense of their own safety [11].

We identified five organizational stressors (unfair reward and treatment, inappropriate safety equipment, provision of training, lack of goal setting, and poor physical environment), two types of stress (emotional and physical), and safety behaviors. The results of correlation and regression analyses revealed the following: (1) injury incidents were minimized by safety behaviors but escalated by a lack of goal setting, (2) safety behaviors were maximized by moderate levels of emotional stress and increased in line with physical stress and inappropriate safety equipment, (3) emotional stress was positively predicted by the provision of training and inappropriate safety equipment, and (4) physical stress was predicted only by inappropriate safety equipment. Based on these results, we suggest various recommendations to construction stakeholders on how to prevent work-related diseases among construction workers.

2. MATERIAL AND METHODS

The study was conducted among about 500 workers in the construction sector for a 3 year period – from January 2021 to December 2024 in Bulgaria. The results of the study are presented using descriptive statistics and Chi-square test. The sex of all employees is male. For the 3 years period the distribution by sex of the workers is as follow: about 45.74% of workers are at age group over 45 year, about 30% are at the age group 36-45 years, about 21.3% are at the age group 26-35 years and about 2.96% of workers are at the age group up to 25 years. The distribution of workers by work experience is as follows: about 88.15% of workers are with work experience up to 2 years, about 6.67% have work experience between 2 and 10 years and 5.18% have work experience over 10 years.

3. RESULTS

For the 2022 year, the results from the annual sick leave analysis show that the most common group of diseases among the workers by frequency is diseases of the respiratory system - 30.37% of all sick leaves, after it are musculoskeletal disorders - 22.51% and after that are some infectious and parasitic diseases - 20.42% of all diseases for the year.

The results of sick leaves are presented with various pathologies. The most common diseases for the 2022 year of the respiratory system are: acute upper respiratory tract infection, unspecified 33.62%, followed by acute bronchitis, unspecified - 20.69% and acute tonsillitis, unspecified - 8.62%. The most common musculoskeletal disorders are: intervertebral disc injuries in the lumbar and other parts of the spine with radiculopathy are 30.23%, lumbosacral plexus injuries are 19.77% and cervical intervertebral disc damage with radiculopathy - 9.3%. Some infectious and parasitic diseases are presented with COVID 19, virus identified - 50% of sick leaves, 32.05% viral infection, unspecified and 11.54% COVID 19, unidentified virus.

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The distribution by duration of sick leaves for 2022 shows that with the longest duration are the musculoskeletal disorders 1281 days, followed by some infectious and parasitic diseases 1059 days and after that are respiratory system diseases 1041 days. The most common pathology by duration of sick leave is: COVID 19, virus identified - 782 days, intervertebral disc injuries in the lumbar and other parts of the spine with radiculopathy - 613 days, acute upper respiratory tract infection, unspecified 200 days, acute bronchitis, unspecified - 188 days and cervical intervertebral disc damage with radiculopathy - 163 days.

For 2023 year the results from the annual sick leave analysis show that the most common group of diseases among the workers by frequency are the some infectious and parasitic diseases - 30.87%, followed by the diseases of the respiratory system - 28.69%, after that are musculoskeletal disorders - 16.67% of all sick leaves for the year.

The results of sick leaves show that in 2023 it was typical for the construction sector pathology. The most common diseases for 2023 year of the some infectious and parasitic diseases are presented with COVID 19, virus identified - 48.67% of sick leaves, 38.05% viral infection, unspecified and 6.19% COVID 19, unidentified virus. The diseases of the respiratory system are presented with: Acute upper respiratory tract infection, unspecified 31.42%, followed by acute bronchitis, unspecified - 23.81% and other acute upper respiratory tract infections of multiple sites - 16.19%. The most common musculoskeletal disorders are: intervertebral disc injuries in the lumbar and other parts of the spine with radiculopathy - 37.7%, lumbosacral plexus injuries - 13.11%, intervertebral disc injury, unspecified and gonarthrosis, unspecified with 4.92% each.

The distribution by duration of the sick leaves for 2023 year is presented with the following group of diseases: with longest duration are some infectious and parasitic diseases - 992 loss days, after that are the diseases of the musculoskeletal system - 822 loss days and the respiratory system with 748 loss days. The most common diseases by duration are: COVID 19, virus identified - 633 loss days, Intervertebral disc injuries in the lumbar and other parts of the spine with radiculopathy - 427 days, acute bronchitis, unspecified - 241 loss days.

The results of health analyze for 2024 year show that most common sick leaves show the following results:

In 2024, 246 workers were absent from work due to illness. There were 398 primary sick notes wtih a total of 5120 days of work loss. The frequent sickness absence in the past year / with 4 or more primary sick notes / was in a total of 16 workers. The longterm sick notes (with more than 30 days of work loss) were 49 employees. As leading groups for employees absence, in order of frequency (number of cases on primary sick notes), the illness groups are ranked as it follows:

- Respiratory diseases - 37.69%
- Diseases of the musculoskeletal system and connective tissue - 16.58%.
- Certain infectious and parasitic diseases - 14.32%.

In order of severity (number of days lost from work), the groups of diseases are as follows:

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- Diseases of the musculoskeletal system and connective tissue - 1222 days.
- Diseases of the respiratory system - 1085 days.
- Diseases of the organs of circulation - 607 days.

Morbidity with temporary disability is represented by a variety of pathologies. The following most frequent diagnoses have been recorded as causing frequent and prolonged loss of work capacity:

- Acute upper respiratory tract infection, unspecified - 13.82 %, 260 days.
- Acute bronchitis, unspecified - 10.55%, 333 days.
- Viral infection, unspecified - 9.55%, 189 days.
- Intervertebral disc injuries in the lumbar and other spinal compartments with radiculopathy - 8.04%, 496 days.

There are no registered occupational diseases in 2024. The data on the registered occupational accidents in the past year show that there were 3 occupational accidents with an incidence of 0.54. In terms of permanent incapacity for work in 2023, there are 11 workers with an expert decision for incapacity of work and the frequency of workers with permanent incapacity for work is 1.99.

The results are valued according to the The "Batkis-Lekarev Scale" it is an orientation-normative tool used in occupational medicine to assess temporary disability among workers. It was developed by the Soviet scientists G. A. Batkis and L. Lekarev and has been applied to analyze the health status of employees in various occupational settings.

Key scale indicators

The scale classifies the health indicators of workers based on the following criteria.
Incidence of HF cases per 100 workers:

- Very low: up to 60 cases
- Low: 60-80 cases
- Medium: 80-100 cases
- High: 100-120 cases
- Very high: more than 120 cases

Incidence of days lost due to IH per 100 workers:

- Very low: up to 600 days
- Low: 600-800 days
- Medium: 800-1000 days
- High: 1000-1200 days
- Very high: over 1200 days

Average duration of one case of HF:10 days

- Below 10 days: medium

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- Over 10 days: high level

According to the results of Batkis-Lekarev it can be concluded that the average duration of a case of temporary incapacity for work is over middle level for the whole period - 12.80. We remark that the highest score is in 2022 - 18.07.

The relative share of short-term temporary incapacity for work shows it is high for the whole period and again is with highest score in 2022 - 12.33, related to 2024 - 9.78.

The relative share of employees who are frequently and long-term sick is characterized by low levels in 2024 - 17.84 but the highest one is in 2023 - 20.2. It makes a strong remark that this level is about two times higher in 2023 than 2022.

Frequency of cases of temporary incapacity for work shows us that in 2023 we have average level - 87.88, followed by 2024 - 72.10 with lower level and the level in 2022 was the lowest one - 65.21.

Frequency of work losses with temporary incapacity for work is high for a three year period but varies and the highest score is 2023 - 1129.65. After that is 2022 - 1178.32 followed by the score of 927.54 in 2024 (Table 1). The results were obtained according to the formula for health analysis which include incidence of occupational losses, obtained from the number of primary hospital admissions per average census, multiplied by 100. Also, the days lost from work are calculated by the total number of days lost from work over the average multiplied by 100.

We can highlight that for the whole research period the relative share of frequency of cases of cases of temporary incapacity for work is at a low level like only in 2023 is at an average level. The frequency of work losses with temporary incapacity for work is high for the whole period. That means the workers were not as often but in long term sickness. This justifies that the diseases are more severe and not short term flues or similar.

The frequency of work related accidents is high for the whole three year period and it is represented with many fractures in different body parts. The most common are:

- Fracture of humerus
- Fracture of the femur
- Fracture of the sacroiliac joint

Very common as well are the falls from heights (Table 1).

For the whole three year period, the results of the annual prophylactic exams show that the most common diseases are :

- Cardiovascular diseases : arterial hypertension
- Musculoskeletal disorders
- Endocrine diseases: diabetes type 2

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Table 1. Comparison for three year period of the main results of the health analysis.

Work incapacity indicators	2022		2023		2024	
	Total	Level	Total	Level	Total	Level
Relative share of employees who are frequently and long-term sick	11.19	Low	20.2	Low	17.84	Low
Frequency of cases of temporary incapacity for work	65.21	Low	87.88	Average	72.10	Low
Frequency of work losses with temporary incapacity for work	1 178.32	High	1129.65	High	927.54	High
Average duration of a case of temporary incapacity for work	18.07	Over middle level	12.86	Over middle level	12.80	Over middle level
Relative share of short-term temporary incapacity for work	12.33	High	12	High	9.78	High

4. CONCLUSION

The results of our three years study shows that the duration of work loss is high like in the whole construction sector. The most common diseases are the diseases of the respiratory system because of all seasonal flues but musculoskeletal disorders are as well as in very high levels. The collected data is from represented annual sick leaves during the three year period. The results of the annual prophylactic exams also confirm that among the most common diseases are the musculoskeletal disorders. It is also common to be registered : arterial hypertension and diabetes type 2. This is because of the unhealthy habits and lifestyle among the employees.

It is very important for measures to be taken to limit the risks associated with the work related risks, to promote healthy lifestyle and for the employer to ensure the usage of personal protective equipment especially during work at height.

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