

ANALYSIS AND TRENDS OF OCCUPATIONAL DISEASES DEVELOPMENT IN FOREST MANAGEMENT OF SLOVAK REPUBLIC

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Abstract

The development of specific occupational diseases in Slovakian forestry has been analyzed in this article. Lesy SR, š.p. (state owned enterprise) is the dominant corporation in the forestry of Slovakia. The frequency and occurrence of major occupational diseases in the period from 2000 to 2007 has been analyzed in this company, including major causes and factors which influence the uprise and development of these occupational diseases (Lyme borreliosis, tick-born meningoencephalitis, professional deafness, vibrations disease) according to regional branches of the named company. At the same time we formulated the trends and tendencies of these diseases as well as the arrangements and measures to be made to improve the situation in this field.

Key words: occupational diseases development, forestry, Lyme borreliosis, tick-born meningoencephalitis, professional deafness, vibrations disease.

Classification JEL: M 140 Corporate Culture, Social Responsibility

1. Introduction

An average man spends about a third of his life at work. Regardless of the job's character (physical or mental strain) work conditions as the type of the executed occupation, work place conditions, level of equipment, work organization, difficulty of the job, influence the man, his work performance, his satisfaction, his health and therefore the quality of his life.

Work conditions and work environment has been dynamically changing in the latest time. The situation in Slovakia has been influenced by the formation of new workgroups types, new types of contracts, relations, technologies and activities. The work environment is becoming less unified and more dangerous as a result of these changes.

Forest management belongs to the industries with high accident rate and sickness rate. Occupational disease can be characterized as a disease, which begins as a consequence of the negative influence of work environment factors, despite all safety measures and the use of personal protective means. The occupational disease development in forestry has been decreasing mildly in past years. One exception is the Lyme borreliosis, which has had a steady increasing character. This decreasing tendency has been influenced also through the transformation of Lesy SR, š.p. Much more activities are being managed by subcontracts and outsourcing.

Higher control of work life is oriented on long sustainable development and on the creation of a competitive advanced economy. One of the main presumptions to reach these goals is the prevention of occupational diseases.

The aim of this article is to present the results of the development analysis of specific occupational diseases in Slovak forestry and to propose system measures for work related disease prevention and elimination.

2. Problem

An occupational disease is a disease recognized by the corresponding health care institution and included in the occupational diseases list registered in the appendix of Social

Insurance Law, if it originated as a result of work related duties or in direct relation to work duties under the conditions stated in this law.

The problem of work related illnesses, work risk and therefore safety at work as well as work conditions is closely related to the topic of forest technology development and advancement Štollmann [8].

Interesting findings about the analysis of vibrations transferred from the steering wheel of a tractor to the arms of the driver are presented by Goglia and Gospodarič [1]. They executed a frequency analysis of vibrations acceleration in third octave range. The results of harmfulness of vibrations were compared with the ISO 5349-1-2001(E) norm diagram and so evaluated the influence of vibrations on the driver.

Goglia et al. (2005) also presents the results of vibrations measurements on a power chainsaw. Measurements were executed on both handles. This author in cooperation with Žgela [2] presents the results of a research, where they watched the change of vibration frequency on the handle of a power chainsaw. Their aim was to determine ergonomic indicators in relation to the blade and chain wear. Out of the total amount of 107 chainsaws on 55 the monitored relation has occurred.

Hitka [3] is focusing on the problem of interconnection and use of ergonomics in terms of human resources management. In the interest of work place conditions Sowa [5] advises in his paper an extensive development of forest work mechanization.

Dangerous workplace

Workplace safety is a category of management responsibility in places of employment. To ensure the safety and health of workers, managers establish a focus on safety that can include elements such as:

- management leadership and commitment,
- employee engagement,
- accountability,
- safety of programs, policies, and plans,
- safety of processes, procedures, and practices,
- safety of goals and objectives,
- safety of inspections for workplace hazards,
- safety of program audits,
- safety of tracking & metrics,
- hazard identification and control,
- safety committees to promote employee involvement,
- safety of education and training,
- safety of communications to maintain a high level of awareness on safety [6].

The noise

Noise is a sound phenomenon, which causes an unpleasant, disturbing, or damaging acoustic perception. There is too many machinery in forest production, where the forest workers are exposed to straight noise, emitted from operated devices. The main negative effects of noise:

- impaired hearing,
- decrease of physical and mental performance,
- early tiredness,
- labor productivity decrease,
- increase of work accidents occurrence probability.

Problem of health protection and safety of the employees in term of noise effects is solved by The Directive of the Council 2003/10/ES. The requests of this Directive are included in new Statutory order of SR n. 115/2006 Z. z. about minimal health and safety requirements for employees protection in term of risks associated with the exposure to noise. Compared to present Statutory order of SR n. 40/2 002 Z. z., the above mentioned order brings some important changes.

Vibration

The source of vibration is a mechanical oscillation. Shake is an action, where the position of the mechanical framework is changed. There are three separate ways of vibrations transmission on the person:

- a) Global transmission – vibration transmission on whole body of standing man, or seated man on vibrating floor, stage, or chair.
- b) Local transmission – vibration transmission from vibrating handle of working tool on worker arm and shoulders.
- c) Individual way – vibration transmission by all of other ways.

Vibration disease makes itself felt by damage of:

- system nervous,
- apparatus nervous,
- arm blood vessels,
- arm bones and joints,
- away apparatuses, on which the vibrations are directly from vibrating tools transferred.

Vibration disease prevention is using of personal protection working means, mainly antivibration gloves, working pause creation and hand massage because of fingerhaemia. Health protection and safety of the employees requests before the vibration action of The Directive of the Council 200/44/ES are included in Statutory order of SR č. 416/2005 Z. z. about minimal health and safety requirements at employees protection before risks associated with vibration exposure (www.exphys.sience.upjs.sk).

Tick-born diseases occurred in Slovak forestry

Lyme borreliosis and Tick-born meningoencephalitis belong to the most often and weightiest infectious diseases occurring in Slovak forestry. The vector of these diseases is tick (*Ixodes ricinus*).

Lyme borreliosis

Hard-bodied ticks of the genus *Ixodes* are the primary vectors of Lyme disease [2]. Lyme borreliosis can be defined as a general infectious disease with the phenomenon of natural epicenter and worldwide occurrence. Causal agent of this infectious disease is bacteria *Borrelia burgdorferi*, which belong to spirochetes. The transferring agent of this bacterium is haematophagous insect, the tick first of all. Number of infected ticks moves from 2 to 40 % in different areas. The bacteria, after the invasion into the host, spreads locally in the skin or in the blood and lymph, easily penetrates into the mucous and gets into the system nervous. Since 1985 it is registered on our territory too.

The disease process can be divided into three phases. The infliction of apparatuses in particular phases are in a specific time succession to the bacterium penetration into the organism. Not all disease phases have to become evident in each patient.

The first phase – after a few days, till weeks, at the place of tick fasten appears round pruriginous erubescence (eritheme chronikum migrans-ECM). This erubescence expands around the puncture place and after some time it starts to move over the body. Different nonspecific symptoms occur: lassitude, tiredness, elevated temperature, headache, hepatitis. Early disease indications of Lyme borreliosis are intermittent and very variable and they continuously improve

or disappear even by untreated patients. By a spontaneous retreat of the ECM the existence of a skin lesion is indicated maximally 6 to 12 months.

The second phase – it begins until 10 months from the tick bite and makes itself evident through arthritis, system nervous affects, where the disease process is similar to cephalomeningitis, kidney injury, liver injury, myocarditis, pseudoblepsia.

The third phase – it occurs after a few months to years, since the disease beginning and it includes the damage of system musculoscelet, system nervous and skin disorders. In this phase morphological changes of organs are present and the medical process is aimed only at stoppage or at deceleration of the disease progress.

Tick-born meningoencephalitis

Tick-borne meningoencephalitis or Tick-borne encephalitis is a tick-borne viral infection of the central nervous system affecting humans as well as most other mammals. The virus can infect the brain (encephalitis), the membrane that surrounds the brain and spinal cord (meningitis) or both (meningoencephalitis). The causal agent of the disease is a virus and it is transferred through a direct bite of an infected tick. The hosts for this virus are mainly rodents and bigger animals.

The incubation period is normally from 7 to 22 days. This disease often starts off with symptoms similar to flu (elevated temperature, headache, tiredness). Diagnosis is made on the base of serological, virological blood and coeliolymph examination. It can be made also by computer tomography (CT), magnetic resonance, or EEG examination. Mostly the disease symptoms are treated: temperature – by antipyretic, sickness – by antiemetic, throes – by analgesic and in extreme situation antiepileptics can be used. For the disease repression virosatics are used. Convenient prevention is by vaccination through the use of weak virus, passive immunization, resp. repellent, or by the use of suitable personal protection working means.

Prognosis also depends on the phase, in which the treatment began. However, the tick-born meningoencephalitis leaves in comparison to borreliosis long lasting effects more often. Prevention: forest management workers are still in contact with dangerous disease vectors therefore the use of protective clothing, specified shoes, regular visual body examination, preventively vaccination and repellents use is recommended.

3. Material, methods and results

Within the preliminary work we have analyzed written knowledge and information concerning this problem in specialized and professional literature. Statistical information from the period 2000 – 2007 had been evaluated according to regional branches of Lesy SR, š.p. This company provided us with its information about the development of occupational diseases. In this article we evaluate the development of 4 most frequent work related diseases in field of forestry in Slovakia: vibrations disease, professional deafness, Lyme borreliosis, tick-born meningoencephalitis.

Statistically processed data represents only new accrued disease cases in named subjects.

The development of occupational diseases is pictured in figure 1. The most frequent professional disease in forest industry is the vibrations disease. This disease had a 66% share in the monitored period 2000 – 2007. Second most frequent disease is the Lyme borreliosis with 26 %. The professional deafness reached 3%. The remaining 5 % represent the category “other” where the tick-born meningoencephalitis has a 95 % share.

The occurrence of the vibration disease development culminated in the year 2002, when 46 cases of this disease were registered. Since this year the frequency curve has been decreasing. Its

first place among the other occupational diseases can be caused by dominant share of motomanual technology, despite the implementation of new technologies in wood logging. The increase of the vibrations disease cases is due to the stricter medical controls (preventive medicine service) and the overexposure of the workers in forestry.

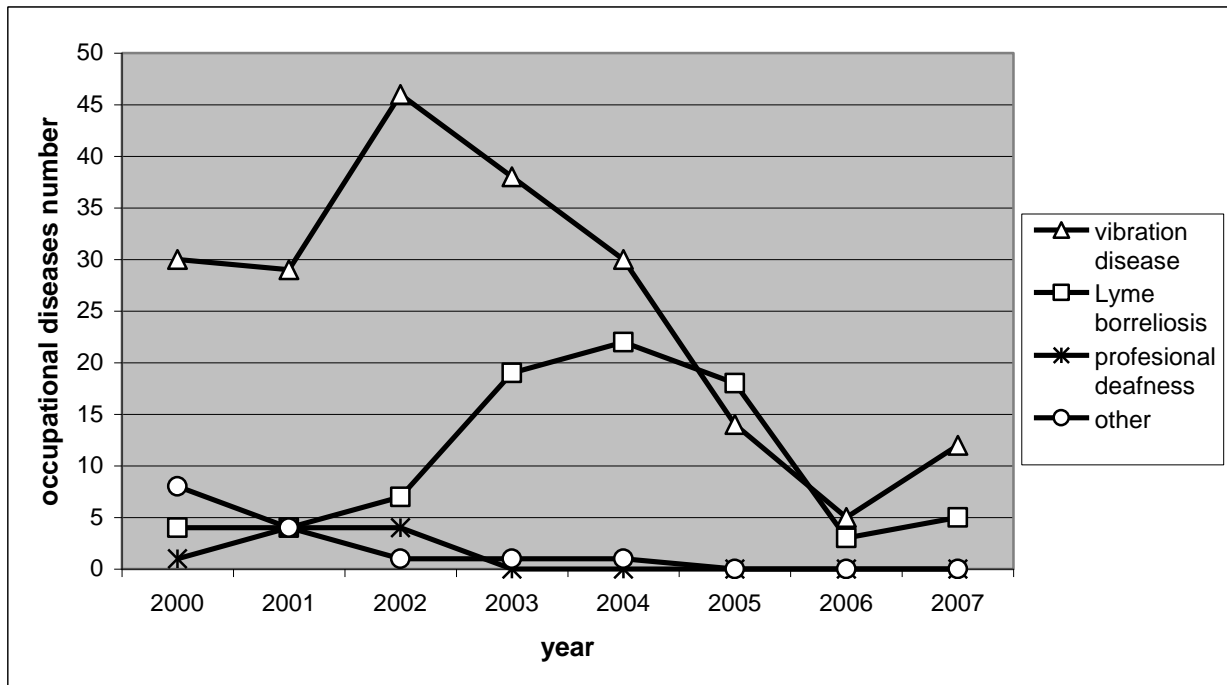


Fig. 1: Occupational diseases development at Lesy SR, š.p.

Lyme borreliosis is also frequent among forest management workers. Maximum occurrence of this disease was registered in 2004. A slight increase of Lyme borreliosis is notable in the last year of the monitored period. We can state, that the lower occurrence of tick-born meningoencephalitis decrease has been caused by following facts: effective precaution measures (vaccination, repellents, regular health examinations).

Decrease of professional deafness cases can be caused by stricter norm, but mainly through job cuts and by the transformation of Lesy SR, š.p.. Much more activities are being managed by subcontracts and outsourcing. (minimalization of doctor visits).

After the comparison of the occupational diseases occurrence in forestry we can point out, that in 2002 that the share of recognized occupational diseases in forestry represented 9.5 % out of all registered occupational disease cases in Slovakia. The maximum share was reached in 2003 – almost 11 %. There had been a decreasing trend since than. This was caused mainly by the increasing of activities realized by contracts and not by own employees. In the coming time a notable increase of occupational diseases in forestry can be expected.

As stated above the vibrations disease (fig. 2) is the most frequent occupational disease in forest industry. The high share of vibration disease in forestry reflected also in its share in all occupational diseases in Slovakia. The amount of the cases culminated in 2002, when 46 new cases were registered, which represents as much as 33% of vibrations diseases recorded in Slovakia. As can be noted on the graph most vibrations diseases during the monitored period occurred at these branches: OZ Košice, Beňuš, Rožňava and Čierny Balog.

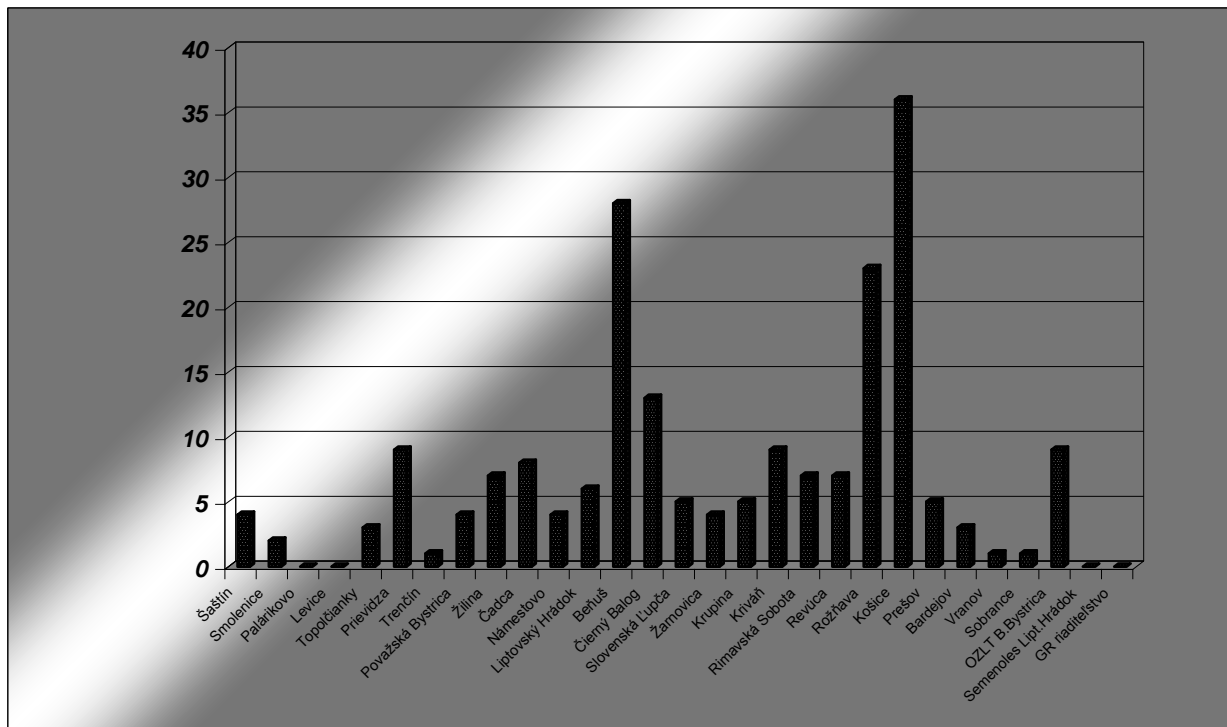


Fig. 2: Vibrations disease occurrence at branches

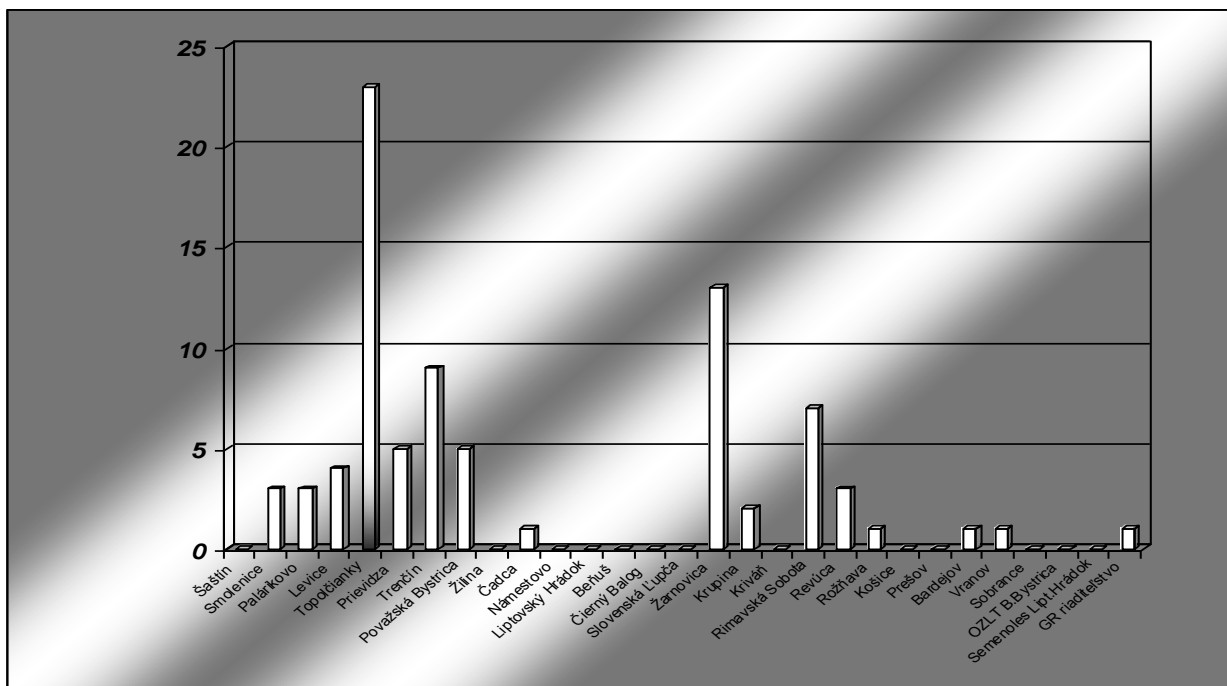


Fig. 3: Lyme borreliosis occurrence at branches in particular years

In Fig. 3 Lyme borreliosis occurrence, in the years 2000 – 2007 is illustrated for all evaluated branches. The highest occurrence of this occupational disease in the monitored period was recorded at Topoľčianky branch. It was in 2003 and 2005 when 8 cases of this disease occurred. The reason for this occurrence is the geographic location of Topoľčianky branch, which is situated in Trábeč Mountains, the most infected part of Slovakia. At this branch but also

others where the share of Lyme borreliosis is high, this is caused by the occurrence of infected ticks and also due to for ticks beneficial climatic factors, that caused ticks to outbreak.

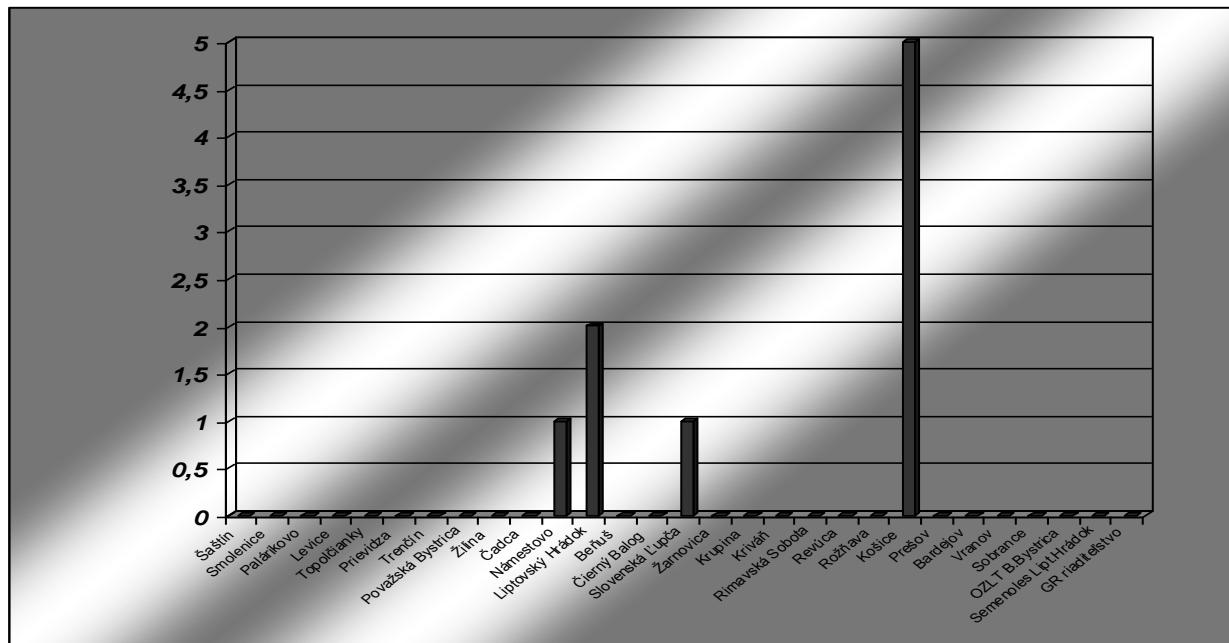


Fig. 4: Professional deafness occurrence at branches

Even though there were no recorded cases of professional deafness during 2003-2005, the noise belongs to significant risk factors in forest work. This is also proved by a 15% share of this disease out of total work related damages of hearing in Slovakia during 2002 and also 8.5% share in 2001. During the monitored period the highest occurrence of this disease was monitored in branches: OZ Košice, Liptovský Hrádok a Slovenská Ľupča.

The highest occurrence of tick-born meningoencephalitis was in 2000 and 2003, when three cases of this disease were registered at Prievidza branch. That relates with geographic position of Prievidza branch and with the epicenter of tick occurrence, analogous to Lyme borreliosis.

The cause of these occupational diseases cases is the constant contact with dangerous transferring agents and due to facts stated by the evaluation of Lyme borreliosis.

4. Conclusion

In the future we can rightfully await the increase of the frequency of these occupational diseases. Determining negative influence on this progress has the change of the way the principal activity realization in Lesy SR, š.p. by delivery works volume, infringement of work regime and break and default of till now received system arrangements. (regular specialized doctor examination, reconditional stays...). Global climatic changes are going to negatively influence the expected rising progress of Lyme borreliosis and tick-born meningoencephalitis occurrence.

Total number of acknowledged occupational diseases in the analyzed period shows a downward trend. Based on the data analyzed in this paper, as well as the data in national and foreign expert literature, we can state the need of attention to the necessity of prevention of supporting-motional system and nervous system disorders (health doctor examination targeted, reconditional stays in a selected profession, working place has to be tailored to ergonomically suitable, down, resp. removal of excess physical loading through mechanization, automatization).

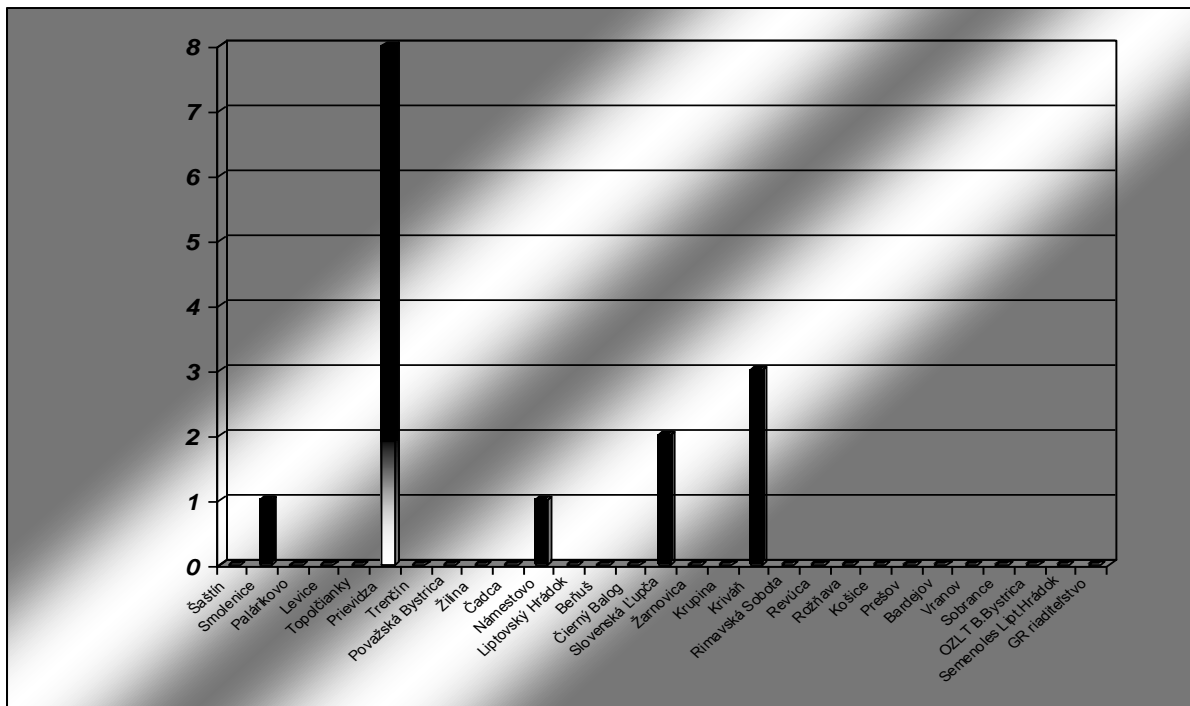


Fig. 5 Occupational diseases occurrence at branches – other (95% of tick-born meningoencephalitis)

The number of occupational diseases caused by long-term excessive and one-sided load, as well as the number of verified suspicions of disease, has an increasing tendency and therefore future attention to this problem is needed.

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