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Analiza stanu wiedzy i świadomości z zakresu chorób przenoszonych przez kleszcze u osób z grupy ryzyka zawodowego

Streszczenie

Wstęp. Choroby przenoszone przez kleszcze, zwane inaczej chorobami transmisyjnymi lub odkleszczowymi, należą do chorób odzwierzęcych (zoonoz) i stanowią poważny problem szczególnie w środowisku eksploatacji lasu i pracy rolnej, gdzie mają charakter chorób zawodowych.

Cel. Celem badań było określenie wiedzy na temat chorób odkleszczowych i ich profilaktyki wśród pracowników eksploatacji lasu.

Materiał i metody. Anonimowe badania ankietowe przeprowadzono wśród 157 pracowników eksploatacji lasu zatrudnionych w 4 nadleśnictwach podległych Regionalnej Dyrekcji Lasów Państwowych w Lublinie. Kwestionariusz ankietowy zawierał pytania z zakresu epidemiologii, kliniki i profilaktyki chorób odkleszczowych, stosowania profilaktyki osobistej podczas pracy oraz sugestii i oczekiwań pracowników leśnictwa odnośnie zapobiegania boreliozie i innych chorób przenoszonych przez kleszcze.

Wyniki badań. Spośród 157 pracowników eksploatacji lasu, zdecydowana większość ankietowanych (87,3%) wykazała się posiadaniem podstawowej wiedzy na temat chorób odkleszczowych. Najczęstszymi działaniami profilaktycznymi były: szczepienia ochronne przeciwko kleszczowemu zapaleniu mózgu (80% badanych), badania profilaktyczne (ponad 90%) i stosowanie repelentów na skórę (75%). Najczęstszymi odpowiedziami w trzeciej części ankiety, były sugestie częstszych badań profilaktycznych (37% udzielających odpowiedzi) a także edycja materiałów edukacyjnych i organizowanie spotkań edukacyjnych.

Wnioski. Pracownicy leśnictwa posiadają podstawową wiedzę z zakresu epidemiologii i profilaktyki chorób odkleszczowych. Profilaktyka chorób odkleszczowych wśród osób z grup ryzyka zawodowego uwzględniająca badania profilaktyczne i akcje edukacyjne, powinna być jednym z naczelnych zadań służb medycyny pracy i bhp.

Słowa kluczowe: choroby przenoszone przez kleszcze, pracownicy leśnictwa, środki zapobiegawcze, stan wiedzy.

Analysis of the state of knowledge and awareness in the area of tick-borne diseases prophylaxis in the population at occupational risk

Abstract

Introduction. Diseases transmitted by ticks, also called transmissive diseases, belong to zoonoses and constitute a serious problem, especially in forestry and agricultural envinronment, as occupational diseases.

Aim. The objective of the study was an evaluation of the state of knowledge of tick-borne diseases and prevention measures in forestry workers.

Material and methods. An anonymous survey was conducted among 157 forest exploitation workers employed in 4 forest inspectorates subordinated to the Regional Management of National Forests in Lublin. The questionnaire form consisted of questions concerning clinics, epidemiology and prophylaxis of tick-borne diseases, using personal protection at work and suggestions and expectations of forestry workers concerning the prophylaxis of borreliosis and other tick-borne diseases.

Results. The majority out of 157 forestry workers (87.3%) revealed basic knowledge in the scope of tick-transmitted diseases. The most frequent preventive activities were: vaccinations against tick-borne encephalitis (80% of all examined), prophylactic medical examinations (over 90%) and application of repellents on the skin at work (75%). Among expectations, the most frequent replies concerned suggestions of more frequent prophylactic examinations (37% of respondents), as well as dissemination of educational materials.

Conclusions. Forestry workers possess basic knowledge in epidemiology and prophylaxis of tick-borne diseases. Prophylaxis of tick-borne diseases among population groups at high occupational risk, including prophylactic examinations and educational activities, should be among the principal tasks of occupational medicine and OSH services.

Key words: tick-transmitted diseases, forestry workers, preventive measures, state of knowledge.

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INTRODUCTION

Diseases transmitted by ticks, also called transmissive diseases, belong to zoonoses and constitute a serious problem, especially as a cause of occupational diseases among forestry and agricultural workers. The reservoir of pathogens inducing transmissive diseases are mainly wild animals, while ticks are vectors of these pathogens. From among transmissive diseases, borreliosis (Lyme disease, Lyme borreliosis) and tick-borne encephalitis and meningitis (TBE) are especially dangerous for the forestry workers, farmers, collectors of forest undergrowth, and hunters [1-14].

An increase observed in the number of cases of Lyme disease worldwide is the result, among other things, of an increase in the abundance of the reservoir and vectors of *Borrelia burgdorferi* (Bb) spirochetes, and also an improvement in the laboratory and clinical diagnostics of this zoonosis. In Poland, morbidity due to borreliosis also shows a growing tendency. In the years 2007, 2008 and 2009, the following numbers of cases of Lyme disease were registered in Poland: 7,731, 8,255, and 10,333, respectively [15]. The data by the Central Register of Occupational Diseases kept at the Institute of Occupational Medicine in Łódź indicate that borreliosis is the most frequent occupational disease in Poland, in the group of infectious diseases. According to the Register [16], in 1997, 89 cases of borreliosis as an occupational disease were diagnosed which constituted 0.8% of all occupational diseases, whereas in 2009, 664 cases of borreliosis as an occupational disease were noted, i.e. 21.1% of all occupational diseases registered in Poland. The epidemiological analysis of the number of TBE cases annually observed in Poland (approximately 300) shows that this number is probably underestimated, because as much as 1.6% of the population reveals the evidence of infection in the form of specific antibodies [17].

The effects of infections with *Borrelia burgdorferi* spirochetes (an etiologic factor of borreliosis) and tick-borne encephalitis virus may be severe. In the case of neuroinfections caused by TBE virus, among other things, the following disorders are observed: paralysis of the limbs, changes in the psychical-emotional sphere, and concentration disturbance. Lyme borreliosis, as a multi-systemic disease, may be manifested by arthritis (Lyme arthritis), paralysis of the peripheral and central nerves, dermatological changes (among other things atrophic dermatitis on extremities), or an impairment of the cardiovascular system (mainly in the form of atrioventricular blocks). An important problem resulting from the infection with tick-borne pathogens are also costs associated with the treatment of active and chronic infections, and costs resulting from possible compensations due to incapability for work. In the case of borreliosis the above-mentioned problems are enhanced by the lack of efficient vaccine against this disease [4,18].

The application of an adequate form of prophylaxis among population groups at risk might, to a considerable degree, prevent morbidity due to tick-borne diseases [19-21]. For effective prophylactic actions it is important that the exposed workers possess basic knowledge on epidemiology, clinics, and prevention of transmissive diseases [20,22,23]. Therefore, the objective of the present study was evaluation of the state of knowledge within epidemiology and prophylaxis of tick-borne diseases, as well as the consideration of the demands and expectations in this area in the exposed occupational group.

MATERIAL AND METHODS

In 2009, an anonymous survey was conducted among 157 forest exploitation workers employed in 4 forest inspectorates subordinated to the Regional Management of National Forests in Lublin, located in the south-eastern part of the Lublin region. The study covered people with various levels of education; performing both manual work (forestry workers, saw operator-feller), and supervision work (forest guard, junior forester, forester, forestry occupation safety and health (OSH) specialist, and supervision engineer).

The questionnaire form consisted of three sections. The first section concerned general knowledge concerning epidemiology and prophylaxis of tick-borne diseases, with particular consideration of borreliosis and TBE, and contained the following questions:

1. What diseases may be caused by microorganisms transmitted by ticks (name at least two)?
2. What is the characteristic clinical symptom of the first stage of borreliosis (does not always occur), which the person bitten may observe by oneself? How does it differ from the ordinary inflammatory reaction after bite?
3. How could one be most efficiently protected against contracting tick-borne encephalitis and meningitis?
4. A virus of tick-borne encephalitis may enter the human body after tick bite. In what other way may it penetrate into the body?
5. Is it possible to be vaccinated against borreliosis?

In the second part of the questionnaire, the employees answered the following questions concerning personal protection means:

Do you apply the preventive measures listed below?; if yes, is it on your own or your employer's initiative, or both on yours and the employer's initiative?

1. preventive vaccinations;
2. repellents on the skin;
3. repellents on clothes;
4. prophylactic examinations for tick-borne diseases;
5. light colour tight clothes;
6. tucking trouser legs into socks, shoes;
7. checking the body and removing ticks within 24 hours after return from forest;
8. use of instruments for the removal of ticks.

The third section included one question concerning the suggestions and expectations of forestry workers concerning the prophylaxis of borreliosis and other tick-borne diseases.

RESULTS

Figure 1 presents the results of studies pertaining to the first section of the questionnaire. All respondents in the study provided an answer to the first question; 87% of them replied correctly and comprehensively to this question; 8% – pro-

vided correct but incomplete replies (e.g. pointing out only borreliosis but not TBE); and 5% – incorrect replies. Similar to question 1, in question 2 (concerning erythema migrans) – 83% of correct answers were obtained, whereas incomplete or incorrect replies were provided by 5% and 12% of respondents, respectively. With respect to question 3 concerning the most effective form of tick-borne encephalitis prophylaxis (i.e. preventive vaccinations), 85% of respondents provided a correct answer. By contrast, 83% of forestry workers in the study incorrectly answered question 4 pertaining to another possibility of contracting an infection with the virus of tick-borne encephalitits than being bitten by a tick (i.e. consumption of raw milk and its products) – with only 13% of respondents providing a correct reply. As many as 83% of respondents correctly answered question 5 pertaining to the possibilities of prophylactic vaccinations against borreliosis – not indicating such a possibility.

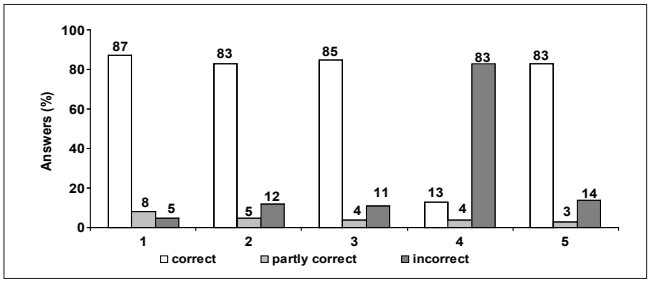

FIGURE 1. State of the knowledge of forestry workers on tick-borne diseases, assessed by replies to following questions: 1 – names of the most important tick-borne diseases; 2 – the most characteristic early symptom of borreliosis; 3 – the most efficient protection measure against TBE; 4 – the mode of infection with TBE virus other than tick bite; 5 – availability of vaccination against borreliosis.

Figures 2 and 3 present the results of the second section of the questionnaire. As many as 81% of respondents provided positive replies to the question concerning preventive vaccinations (against TBE) (Fig.2). The data show that out of the workers providing positive reply, the majority (80%) are vaccinated on the employer's initiative (Fig.3). One hundred and eighteen (118) respondents (76%) reported that they applied repellents on the skin at work. Considering their own or employer's initiative, or both their own and employer's initiative, the percentages of positive answers were similar: 36%, 33% and 31%, respectively. A considerably smaller number of forestry workers (59%) applied repellents on clothes (Fig.2). The greatest majority of forest exploitation workers are subject to prophylactic medical examinations for tick-borne diseases (90%); of which 78 are examined on employer's initiative (Fig.3). The most of respondents (47-61%) negatively answered the questions concerning the use of proper clothes while performing work activities in the forest environment; whereas 92% of forestry workers declared inspection of the body and removal the ticks. More than a half of the employees (53%) did not use any instruments for removing ticks.

The results of the third section of the questionnaire are presented in Figure 4. The question concerning demands and expectations with respect to the prophylaxis of borreliosis and other tick-borne diseases was answered by only 86 respondents (55%). The greatest number of replies were not precise (one or two words), and the most frequent replies concerned suggestions of more frequent prophylactic examinations (35% of respondents), as well as dissemination of educational materials and organization of lectures (26% of respondents).

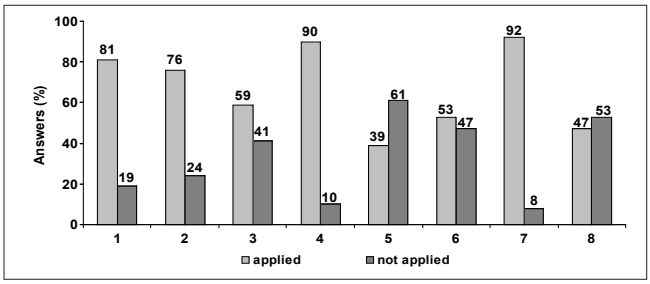

FIGURE 2. Preventive measures against tick-borne diseases applied by the workers: 1 – vaccinations; 2 – repellents on the skin; 3 – repellents on clothes; 4 – prophylactic examinations for tick-borne diseases; 5 – light colour tight clothes; 6 – tucking trouser legs into socks, shoes; 7 – checking the body and removing ticks within 24 hours after return from forest; 8 – use of instruments for the removal of ticks.

FIGURE 3. Initiative for the application of preventive measures against tick-borne diseases (of the worker, employer, or both): 1 – vaccinations; 2 – repellents on the skin; 3 – repellents on clothes; 4 – prophylactic examinations for tick-borne diseases; 5 – light colour tight clothes; 6 – tucking trouser legs into socks, shoes; 7 – checking the body and removing ticks within 24 hours after return from forest; 8 – use of instruments for the removal of ticks.

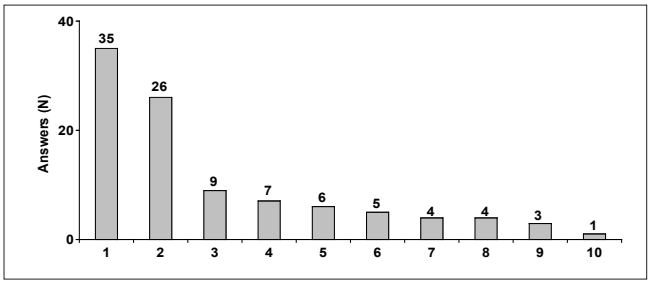

FIGURE 4. Demands and expectations with respect to the prophylaxis of tick-borne diseases expressed by the inquired forestry workers: 1 – more frequent prophylactic examinations; 2 – dissemination of educational materials and organization of lectures; 3 – vaccination against borreliosis; 4 – use of the proper protection clothes; 5 – use of repellents; 6 – better availability of medical services; 7 – use of instruments for the removal of ticks; 8 – better laboratory diagnostics (RT PCR); 9 – checking the body for the presence of ticks; 10 – reduction of stay in the forest.

DISCUSSION

People who are present in forest areas of high tick activity, i.e. performing work in the forest environment (forestry employees, farmers, collectors of forest undergrowth), as well as those present in this environment for recreation purposes, are most exposed to infection by *Borrelia burgdorferi* spirochetes and the virus of tick-borne encephalitis and meningitis. The results of evaluation of the state of knowledge

concerning prophylaxis of tick-borne diseases among population groups at risk are a good measure of the effectiveness of actions aimed at decreasing the morbidity due to transmissive diseases.

The answers to the questions in the first section of the questionnaire show that, except from the question concerning other possibility of contracting TBE virus than being bitten by a tick, the largest majority of respondents (over 80%) possess a basic knowledge pertaining to tick-borne diseases. This may evidence studying popular scientific materials by these people or participation in educational lectures. However, the percentage of incorrect replies ranging from 5%-14.0% indicates the necessity to continue various forms of prophylaxis in this occupational group. The analysis of replies to the questions in the second section of the questionnaire confirms that not all workers are subjected to prophylactic vaccinations against tick-borne encephalitis. Based on own observations, the percentage of workers vaccinated should be considerably higher. Here, the possibility of not understanding the question by respondents should be considered (i.e. associating these vaccinations with immunization against borreliosis), as well as the fact that forestry workers are vaccinated on a voluntary basis.

The percentage of forestry workers applying repellents and personal protection means while performing work activities is also low, which may indicate that such means are not provided by the employer, or the employer does not, in a categorical way, recommend the application of such means. Similarly, the replies concerning proper clothes and way of dressing during the stay in the forest indicate that forestry workers do not possess clothes of a light colour, in which they should perform work during the months of high ticks activity. A positive observation in the second section of the questionnaire is the fact that nearly 90% of respondents cautiously check their body surface after return from forest areas.

The answers to the question in the third section of the questionnaire demonstrate that the examined forestry workers expect more frequent prophylactic examination and dissemination of educational materials.

Studies concerning the methods of prophylaxis of tick-borne diseases were conducted in several scientific centres in Poland and abroad. The survey conducted by Bartosik et al. [22] among 300 inhabitants of south-eastern Poland concerning the methods of preventing tick-borne diseases, showed that the most frequently reported activity was the application of repellents (38% of respondents), and wearing proper clothes (35%). According to these researchers, the use of repellents, as well as checking the body surfaces, was considerably more frequently declared by urban than rural inhabitants, 45% versus 22%, respectively. The researchers quoted also showed that 1% of the population occupationally exposed to tick bites did not possess knowledge concerning the consequences resulting from the contact with ticks and the development of an infectious disease.

Zielińska-Jankiewicz and Kozajda [20] examined the knowledge on specific and important biological hazards in the groups of workers employed in health services, forestry and municipal services, and found that forestry workers revealed the highest level of such knowledge. Kozajda et al. [21] noted that the interviewed workers were able to sufficiently protect their health against biological hazards despite generally low knowledge of risks related to these hazards. Thorin et al. [13], in the survey which covered 2,975 people of the group at risk, i.e. forestry workers from the areas of eastern France, confirmed the necessity to continue vaccinations in this population group, and also indicated the importance of actions associated with the spread of information pertaining to tick-borne diseases among this occupational group. The experiment carried out by Korenberg et al. [24], consisting in microscopic identification of *Borrelia* spirochetes in *Ixodes persulcatus* ticks taken from the body surface of people bitten by these ticks, and the subsequent administration of doxycycline twice 100 mg daily to these people, proved the efficiency of these actions in the prevention of morbidity due to borreliosis. So far, no effective vaccine against borreliosis was invented, therefore, paying attention to the necessity of conducting educational actions, use of proper clothes and repellents, as well as quick and correct removal of ticks, are the most effective methods today for preventing Lyme borreliosis. According to Patey [25], at present, the most effective prophylactic methods protecting against infection with *Borrelia burgdorferi* are as follows: protective clothes, application of repellents, checking body surface and removal of ticks after return from endemic areas and - if tick bite has occurred – observation of the site of bite for the nearest weeks in order to begin therapy in the case of occurrence of erythema migrans.

The data from literature indicate that tick-borne encephalitis is a disease which should not be disregarded, because this illness may have severe permanent consequences. Therefore, the European Advisory Group for the comprehensive vaccination programme established by the WHO recommends that the countries where TBE occurs endemically, precisely identify the areas at high risk of contracting this disease, simultaneously specifying the possibility of selective use of vaccine against TBE [17]. As demonstrated by scientific reports, vaccine against TBE shows one of the highest degrees of effectiveness among all inactivated vaccines, which is evidenced by a decreasing number of TBE cases in the countries applying preventive vaccination. While carrying out such vaccinations, especially among the groups at high occupational risk, the economic benefits resulting from efficient TBE prophylaxis cannot be omitted. While discussing the problem of preventive vaccinations against TBE, scientific reports should be taken into consideration which describe the development of neuroinfection in people aged over 50, despite their being vaccinated against TBE. Also, studies are suggested concerning the determination of the period of effectiveness of vaccinations in older population [26].

The studies by Adamek et al. [27] conducted among forestry workers and concerning the use of tick-borne diseases preventive methods, confirmed that despite multi-bites by ticks, less than 30% of forestry workers applied repellents and proper clothes, and only 11 from among 51 respondents were subjected to preventive vaccinations against TBE.

CONCLUSIONS

1. The results of the questionnaire survey indicate that forestry workers possess basic knowledge in epidemiology and prophylaxis of tick-borne diseases.

2. Among the protective measures used by the respondents the most common (81-92%) were: vaccination against tick-borne encephalitis, prophylactic medical examinations, and checking the body and removing ticks within 24 hours after return from forest.
3. Despite the fact that the majority of respondents confirmed that they possessed knowledge on tick-borne diseases, it is necessary to carry out systematic educational actions.
4. Prophylaxis of tick-borne diseases among population groups at high occupational risk should be among the principal tasks of occupational medicine and OSH services.

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