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INVASIVE TAPEWORM INFECTIONS IN POLAND IN 2011

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ABSTRACT

The aim of this work was to assess the epidemiological situation of echinococcosis and cysticercosis in 2011 as compared to previous years.

MATERIALS AND METHODS. Assessment of the epidemiological situation was carried out on the basis of individual data submitted to NIZP-NIH by the District Sanitary- Epidemiological Stations as well as from data gathered from annual bulletins "Infectious diseases and poisoning in Poland".

RESULTS. In 2011 there were in total 19 registered cases of echinococcosis; unspecified, *E. granulosus*, and *E. multilocularis*. Incidence was 0.049/100,000. The highest incidence was recorded in Podlaskie district (0.333/100,000). The reported cases occurred in adults between the age of 34 and 74 (average 56.4; median 58), more often in women (incidence 0.055) than in men (incidence 0.043). Incidence of echinococcosis was higher in the country (0.079) than in the city (0.030). The percentage of reported cases in which the species of a tapeworm was identified was 63%, and within that 42% were infections with *E. granulosus*, and 21% with *E. multilocularis*. In 2011 there were two registered cases of cysticercosis and the incidence was 0.005 per 100,000 population.

CONCLUSION. It seems necessary to consider the introduction of obligatory differentiation tests for *E. granulosus* and *E. multilocularis* infections. It is also important to introduce a definition of cysticercosis for the purpose of epidemiological surveillance. It is recommended to intensify health promotion, including education targeted at reducing the risk of contracting invasive tapeworm infections.

Key words: echinococcosis, *E. granulosus*, *E. multilocularis*, cysticercosis, *Taenia solium*, epidemiology, Poland 2011

INTRODUCTION

Since 1977 routine epidemiological surveillance reports provide information regarding the number of registered cases of echinococcosis; an invasive tapeworm infections that in Poland are caused by tapeworm larvae of *Echinococcus granulosus* (hydatidosis) or *Echinococcus multilocularis* (alveococcosis). The reports also register the number of cysticercosis cases - another tapeworm infection caused by *Taenia solium* larvae.

Invasive tapeworm infections are acquired by the ingestion of tapeworm eggs excreted with faeces of definite hosts: dogs (*E. granulosus*, and *E. multilocularis*), foxes (*E. multilocularis*), and humans (*T. solium*). The larvae can be located in different organs and tissues; their formation and invasion process depends on the tapeworm species. *Echinococcus* cysts, unilocular

(*E. granulosus*) and multilocular (*E. multilocularis*), are most frequently detected in liver. Growing cysts of *E. granulosus* press on the surrounding tissue, mechanical damage to the cysts resulting in the spreading the oncospheres into the peritoneal and/or pulmonary cavity. *E. multilocularis* grows infiltratively, and is able to metastasize. New cysts arise in distant tissues and organs, often in the nervous system, which is also a particularly frequent target for *T. solium* cysticercus (neurocysticercosis).

AIM

Assessing the epidemiological situation of invasive tapeworm infections: echinococcosis and cysticercosis in 2011, in comparison with the situation in previous years.

MATERIALS AND METHODS

The assessment of the epidemiological situation was carried out on the basis of aggregated data from routine surveillance published in the annual bulletin "Infectious diseases and poisoning in Poland in 2011" (Warsaw 2012, NIZP-PZH, GIS) as well from newsletters published in previous years. Additionally, data came from reports (epidemiological interviews) about the registered prevalence of invasive tapeworm infections cases send to the Epidemiological Department of NIPH-NIH by Sanitary- Epidemiological Stations. Until 2011, all reported cases of cysticercosis were registered, and all *Echinococcus* infections were registered until 2004. Since 2005 the case definition of echinococcosis complies with the EU recommendation which was amended in 2009.

At the moment, cases of *Echinococcus* infection are registered if they fulfil at least one of 5 criteria:

- Detection of *E. granulosus* or *E. multilocularis* through histopathological or parasitological tests.
- Detection and surgical sample removal of a cyst distinctive to *E. granulosus*
- Detection of typical organ changes through an imaging test as well as aetiology confirmed through serological test.
- Highly sensitive serological test with positive result and confirmation of the test result with high specificity test.
- Detection of *E. granulosus* or *E. multilocularis* genetic material in the clinical material.

RESULTS AND DISCUSSION

Echinococcosis cases. From 1977 (i.e. isolating *Echinococcus* infection cases in epidemiological reports), till 2010 the number of cases registered annually in Poland ranged from 20 cases (incidence 0.05/100,000 population in 2004) to 65 (incidence 0.17/100,000 in 2006), without an obvious temporal trend (Fig. 1). In 2006 there was a relatively high number of echinococcosis, which was due to an active search for unreported cases among laboratory - confirmed cases between 2003-2005 of the Department of Medical Parasitology NIPH – NIH. There were 19 of echinococcosis cases registered in 2011 (incidence 0.049/100,000 population). The number of reported cases was at its lowest in the last 15 years; almost half. Given the slow progression of the disease, the decline in the number of registered cases should not be treated as a result of the improved epidemiological or epizootiological situation, but as an effect of normal fluctuation.

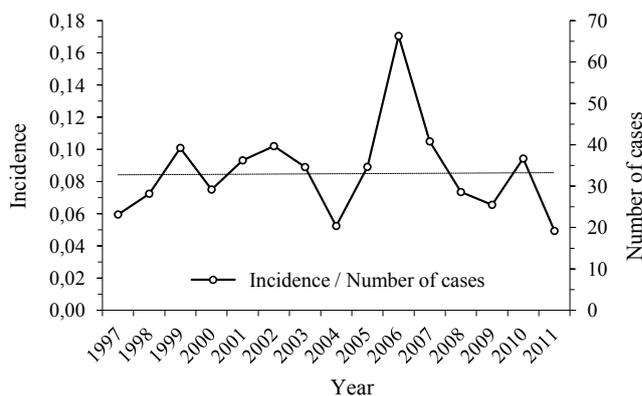


Fig. 1. Echinococcosis in Poland in 1997-2011. Number of cases and incidence per 100,000 population

In 2011 echinococcosis was registered in 9 districts (in 2010 in 6). The highest incidence rate was noted in the following districts: Podlaskie (0.333), Warmińsko-Mazurskie (0.206), and Lubelskie (0.138), (Table 1). Judging by the average annual incidence, between 1998-2010, among the districts in Poland where *Echinococcus* infections were noted the first was Podlaskie district. The annual average incidence rate between 1998-2010 (0.78 per 100 000 population) there was more than twice as high as in the second district, Warmińsko-Mazurskie (0.33). It should also be noted that in the 15 years registering *Echinococ-*

Table I. Echinococcosis in Poland in 2005-2011. Number of cases and incidence per 100,000 population by province

Province	Median 2005-2009		2010		2011	
	Number of cases	Incidence	Number of cases	Incidence	Number of cases	Incidence
POLAND	34	0.089	36	0.094	19	0.049
1. Dolnośląskie	-	-	-	-	-	-
2. Kujawsko-pomorskie	4	0.194	1	0.048	-	-
3. Lubelskie	5	0.230	7	0.325	3	0.138
4. Lubuskie	-	-	-	-	1	0.098
5. Łódzkie	2	0.077	-	-	1	0.039
6. Małopolskie	-	-	-	-	-	-
7. Mazowieckie	2	0.039	12	0.229	3	0.057
8. Opolskie	-	-	-	-	-	-
9. Podkarpackie	1	0.048	3	0.143	-	-
10. Podlaskie	7	0.583	4	0.336	4	0.333
11. Pomorskie	-	-	-	-	2	0.088
12. Śląskie	-	-	-	-	1	0.022
13. Świętokrzyskie	-	-	-	-	-	-
14. Warmińsko-mazurskie	5	0.350	9	0.630	3	0.206
15. Wielkopolskie	4	0.119	-	-	1	0.029
16. Zachodniopomorskie	1	0.059	-	-	-	-

Source: Infectious diseases and poisonings in Poland. NIZP-PZH, GIS. Warsaw. Annals 2005-2011

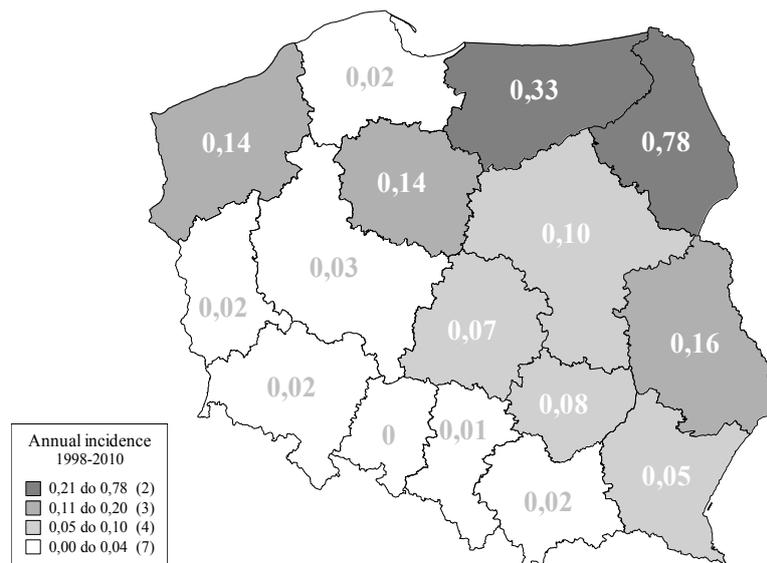


Fig. 2. Echinococcosis in Poland in 1998-2010. The average annual incidence per 100,000 population by province

cus cases separately in the Opolskie district no cases of this disease were noted there (Fig.2). In 2011, most of the echinococcosis cases were reported in rural areas (12, i.e. 63%). In 2011 the incidence in rural areas was 0.079 / 100 000 which was 2.5 times higher than the incidence in cities (0.030). This locality - based incidence discrepancy, so characteristic for many zoonoses was also observed between 1997-2010, and the average annual incidence (0.117) during this period in rural areas was about 65% higher than in urban ones (Table. 2). Similarly to previous years, there were more echinococcosis cases among women (incidence rate 0.055/100,000) than men (0.043), however in 2011 the incidence difference according to gender was definitely lower than that reported previously (28%). In the years 1997-2010 the average annual incidence rate, women - to - men ratio was 2.6-1 (Table2).

Only adult infections cases were reported in 2011, aged from 38-74 (average 56.4, median 58.0). A higher incidence rate of *Echinococcus* infections among adults was also noted in previous years, especially for people over the age of 49 (Table 2).

In 37% of the reported echinococcosis cases (7 cases) the species of *Echinococcus* tapeworm was not determined, in 8 cases (42%) *E. granulosus* was identified, and in 4 cases (21) *E. multilocularis*. This is a real although insufficient progress compared to the early years of echinococcosis registration, in which unspecified *Echinococcus* species consisted the overwhelming majority of reports (Fig.3.). In total, from 1997 till 2010, in 74% of cases the species of tapeworm were not identified. Among the determined echinococcosis cases, hydatidosis (*E.granulosus*) cases were over 2.5

Table II. Echinococcosis in Poland in 1997-2010. Number of cases, mean annual incidence rate per 100,000 population, and percentage of cases by age, gender and location (urban/rural)

Age, years	Gender						Location						Total		
	Male			Female			Urban			Rural			Number of cases	Incidence	%
	Number of cases	Incidence	%												
00 - 04	2	0.014	1.6	5	0.038	1.4	3	0.020	1.3	4	0.033	1.7	7	0.026	1.5
05 - 09	9	0.057	7.1	9	0.060	2.6	9	0.054	3.8	9	0.065	3.7	18	0.059	3.8
10 - 14	13	0.069	10.3	11	0.061	3.1	14	0.068	6.0	10	0.062	4.1	24	0.065	5.0
15 - 19	8	0.037	6.3	10	0.048	2.9	7	0.028	3.0	11	0.064	4.5	18	0.043	3.8
20 - 24	2	0.009	1.6	16	0.074	4.6	8	0.029	3.4	10	0.060	4.1	18	0.041	3.8
25 - 29	7	0.033	5.6	19	0.093	5.4	12	0.046	5.1	14	0.090	5.8	26	0.063	5.5
30 - 39	11	0.030	8.7	30	0.083	8.6	17	0.038	7.3	24	0.086	9.9	41	0.056	8.6
40 - 49	20	0.050	15.9	55	0.137	15.7	37	0.072	15.8	38	0.133	15.7	75	0.094	15.8
50 - 59	21	0.064	16.7	77	0.217	22.0	56	0.123	23.9	42	0.185	17.4	98	0.144	20.6
60 - 69	21	0.104	16.7	66	0.258	18.9	41	0.141	17.5	46	0.276	19.0	87	0.190	18.3
70 +	12	0.072	9.5	52	0.172	14.9	30	0.109	12.8	34	0.176	14.0	64	0.136	13.4
Ogółem	126	0.048	100.0	350	0.126	100.0	234	0.071	100.0	242	0.117	100.0	476	0.089	100.0

Source: Case-based reports sent to Epidemiology Department NIPH-NIH by sanitary-epidemiological stations

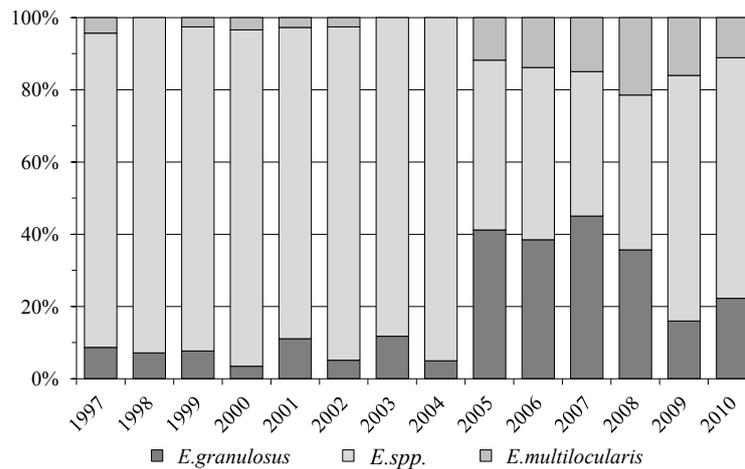


Fig. 3. Echinococcosis in Poland in 1997-2010. Percentage of cases by species of *Echinococcus*

more frequent (20.6% of all cases; 72.1% specific) than alveococcosis cases (*E. multilocularis*-8% cases; 27.1% specific).

In 2011, the number of hospitalized people was 17, 89.5% of all reported cases. The Central Statistical Office recorded one death caused by an unspecified liver echinococcosis (female village resident 40-44 years old).

Cysticercosis cases. In 2011, as well as in the previous year, 2 cases of cysticercosis were reported in Poland (incidence 0.005 /100 000). Over the past several years the incidence of cysticercosis in Poland remained at a steady low level, with cases recorded sporadically. In the years 1997 - 2010 surveillance reported a total of 11 such cases. In 2011 there were two cases, one in the Malopolskie district (male, 33 years old, city dweller), and second in Mazowieckie district (female, 22 years old, village dweller).

CONCLUSION AND SUMMARY

In 2011 there was a significant, but rather random drop in the number of *Echinococcus* infections cases, both in relation to previous years and to the median from the years 2005-2009. Cases of *E. granulosus* infection are still registered more often. Since 2010 there has been a persistent decline in the percentage of the

reports containing specified etiological factor of echinococcosis which is disturbing. However, no changes in the epidemiological situation of cysticercosis were observed. Throughout the years only singular cases of this disease have been noted.

Due to their chronic course, invasive tapeworm infections pose a serious challenge for epidemiological surveillance. It seems necessary to consider introducing mandatory (for clinical and epidemiological purposes) diagnostics standards for differentiating between *E. granulosus*, and *E. multilocularis* infections, as well as introducing a cysticercosis definition for epidemiological purposes. It is recommended to intensify health promotion, including education targeted at reducing of the risk of contracting invasive tapeworm infections.

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