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THE BURDEN OF HERPES ZOSTER AND ITS COMPLICATIONS IN POLAND IN ACCORDING TO THE AGE

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ABSTRACT

BACKGROUND. Incidence of shingles in different regions of the world ranged from 300 to 500/100 000 persons, and in the population older than 80 years of age reaches more than 1000/100 000. In the age group 50+ the incidence is enough high to be a serious medical and economic burden. Lack of details about the incidence and frequency of complications in Polish population let us too made an attempt to assess the scale of the problem, among others to the purpose of the evaluation of the legitimacy of implementing vaccination in the 50+ population.
METHODS. First, based on coming data from the Świętokrzyskie Province Division of the National Health Fund we judged the incidence of shingles in this province in 2013 in individual ancient groups and depending on detailed diagnoses and with the division into the basic health, clinic and hospital care. Second, based on gathered data through NIZP-PZH, we judged hospital morbidity connected with shingles in Poland in 2008-2012 years, in individual ancient groups.
RESULTS. Extrapolating the data from the Świętokrzyskie province we assess the incidence of shingles on average 338.8/100 000. She is tallest in the age group 50+ (614.3/100 000) and in this group also the most complications are being observed. Hospital morbidity in entire Poland showed in 2008-2012 years the frequency on average 4.93-5.42/100 000, in the group of 0-19 years; 0.10-1.50/100 000, in the group of 20-49 years; 4.9-5.42/100 000 and in the 50+ group - 9.99-13.37/100 000.
CONCLUSIONS
1. Shingles, especially in the 50+ age group, constitutes a serious health problem in Poland, being a cause of numerous advices in basic health care and at clinics in Poland, as well of numerous hospitalizations and dangerous complications.
2. It seems, that active immunization against shingles, especially of 50+ persons, would be a favourable solution from the individual, as well as public perspective.

Key words: *herpes zoster, epidemiology, incidence rate, hospitalizations, complications*

INTRODUCTION

Herpes zoster is caused by reactivation of the varicella zoster virus (VZV). All people with a history of varicella are susceptible to herpes zoster. Reactivation of VZV is a complex process, but the key role is played by the overall reduction in the T cell-dependent response – and in particular, the T cell-dependent response to VZV – related to the ageing of the immune system and various factors leading to immunosuppression (1, 2). After the primary infection of mucosae, dermis and dermal sensory nerves, VZV remains latent in ganglia, most frequently from Th3 to L3. After many years or even decades, the virus may replicate in the ganglia in the course of HIV infection, Hodgkin's lymphoma, non-Hodgkin's lymphomas, leukemia's and systemic lupus erythematosus, following organ transplantation, or as an effect of certain drugs, stress, malnutrition and the natural process of ageing of the immune system (3). As a result of virus reactivation, sensory nerve endings in the dermis are infected and typical vesicular eruption occurs. The patient complains of decreased sensation and pain, and if motor neuron is involved, of muscle weakness. The risk of developing herpes zoster is es-

timated at 10-30%, and is closely related to age (4, 5). The most common (occurring in about 20% of patients) (6, 7) and at times most serious complications of herpes zoster include herpes zoster ophthalmicus, various types of bacterial superinfection and neurological complications such as meningitis, encephalitis and in particular postherpetic neuralgia (PHN) (2, 8). The latter affects 60-70% of patients with herpes zoster who are over 60 years old (6, 7), is poorly manageable with the available therapies, and has a negative impact on the patients' functional status and the quality of life. With age, the risk and severity of complications, as well as the risk of hospitalization, are steadily increasing (9, 10).

The incidence of herpes zoster in various regions across the world was analyzed based on a systematic review of literature, among others Kawai et al. (11). The review included 130 studies from 26 countries (Poland excluded), and it showed the incidence of 3-5/1,000 person-years (in the case of persons aged over 80 years, the incidence rate was 10 and more per 1,000 person-years). In the analysis, the risk of developing PHN was 5-10%. In about 30% of patients with PHN, pain persisted for over one year. The rate of herpes zoster recurrence was estimated at 1-6%, and the frequency of hospital admissions ranged between 2 and 25 per 100,000 person-years.

A number of studies assessing the incidence of herpes zoster show a marked predominance of females (12, 13, 14).

The risk factors for developing herpes zoster, apart from age, include rheumatoid arthritis, inflammatory bowel diseases, COPD (chronic obstructive pulmonary disease), asthma, chronic kidney diseases, depression, lymphomas and myelomas (15).

Progressive ageing of the population in developed countries may translate into an increasingly pressing problem of herpes zoster in the elderly and a stronger emphasis on applying effective prophylaxis, i.e. immunization, although the most recent position of the WHO on the subject is not unequivocal (16).

Since the data on the incidence of herpes zoster and the frequency of complications in the Polish society, which is also ageing, are scarce, we undertook to present the scale of the herpes zoster problem in Poland by age. This may help, among others, to assess the validity of an immunization programme for the population over 50-60 years of age.

METHODOLOGY

First, we assessed the incidence of herpes zoster (the number of new cases per 100,000) in the Świętokrzyskie voivodeship in 2013 by age groups and by specific diagnosis, as well as by the type of healthcare received – primary healthcare, ambulatory healthcare and hospital care – and by the form of herpes zoster. The data come from the Świętokrzyskie branch of the National Health Fund (NFZ). The size of individual age groups was determined based on data from the Central Statistical Office of Poland (GUS) for 2013.

Secondly, based on data gathered by NIZP-PZH, we assessed in-hospital morbidity of herpes zoster in Poland in the years 2008-2012 by age groups.

Confidence interval (CI) for the incidence of herpes zoster was calculated using the WinPepi statistical package (17).

Table I. The incidence of herpes zoster in the **Świętokrzyskie** voivodeship in 2013 by age groups

Age	Vojvodship świetokrzyskie population size	**N***	**Rate/100,000**	**95% confidence interval**
< 18 years	249,953	270	108.0	95.52 – 121.70
18-49 years	537,558	1,074	199.8	188.03 – 212.10
> 50 years	480,728	2,953	614.3	592.38 – 636.77
Total	1,268,239	4,297	338.8	328.78 – 349.08

*Persons who have been entered in the healthcare system as diagnosed with B02 once in the year (PHC, AHC or hospital care).

Table II. The incidence of herpes zoster in the **Świętokrzyskie** voivodeship in 2013 by detailed diagnosis and by age (per 100,000)

ICD-10	**Diagnosis – name**	**Below 18 years**	**18-49 years**	**Over 50 years**	**Total**
B02	HERPES ZOSTER	0.2	174.9	520.7	290.2
B02.0	ZOSTER ENCEPHALITIS (G05.1*)	0.0	1.5	4.6	2.7
B02.1	ZOSTER MENINGITIS (G02.0*)	0.0	0.0	0.4	0.2
B02.2	ZOSTER WITH OTHER NERVOUS SYSTEM INVOLVEMENT	0.0	0.0	1.5	0.6
B02.3	ZOSTER OCULAR DISEASE	0.0	0.0	1.5	0.6
B02.7	DISSEMINATED ZOSTER	0.2	0.0	0.8	0.4
B02.8	ZOSTER WITH OTHER COMPLICATIONS	0.9	1.3	9.4	4.4
B02.9	ZOSTER WITHOUT COMPLICATIONS	10.8	22.1	75.5	39.8
B02	Total	108.0	199.8	614.3	338.8

Table III. The incidence of herpes zoster and its types in the **Świętokrzyskie** voivodeship in 2013 by age group and healthcare type (per 100,000)

Type of healthcare	ICD-10	Diagnosis – name	Below 18 years	18-49 years	Over 50 years	Total
Ambulatory healthcare (AHC)	B02	HERPES ZOSTER	4.8	20.5	72.6	37.1
	B02.0	ZOSTER ENCEPHALITIS (G05.1*)	0.0	0.2	0.4	0.2
	B02.1	ZOSTER MENINGITIS (G02.0*)	0.0	0.0	0.2	0.1
	B02.2	ZOSTER WITH OTHER NERVOUS SYSTEM INVOLVEMENT	0.0	0.0	0.2	0.1
	B02.3	ZOSTER OCULAR DISEASE	0.0	0.0	0.4	0.2
	B02.7	DISSEMINATED ZOSTER	0.0	0.0	0.4	0.2
	B02.8	ZOSTER WITH OTHER COMPLICATIONS	0.0	0.4	2.3	1.0
	B02.9	ZOSTER WITHOUT COMPLICATIONS	2.0	4.1	23.3	11.0
Total AHC			6.8	25.1	99.8	49.8
Primary healthcare (PHC)	B02	HERPES ZOSTER	90.0	156.3	458.9	257.9
	B02.0	ZOSTER ENCEPHALITIS (G05.1*)	1.6	1.3	4.0	2.4
	B02.1	ZOSTER MENINGITIS (G02.0*)	0.0	0.0	0.2	0.1
	B02.2	ZOSTER WITH OTHER NERVOUS SYSTEM INVOLVEMENT	0.0	0.0	0.2	0.1
	B02.3	ZOSTER OCULAR DISEASE	0.0	0.0	0.4	0.2
	B02.7	DISSEMINATED ZOSTER	0.0	0.0	0.2	0.1
	B02.8	ZOSTER WITH OTHER COMPLICATIONS	1.2	0.6	1.5	1.0
	B02.9	ZOSTER WITHOUT COMPLICATIONS	7.2	16.6	43.9	25.1
Total PHC			100.0	174.7	509.2	286.8
Hospital care (HOSP)	B02	HERPES ZOSTER	0.4	0.6	5.8	2.5
	B02.0	ZOSTER ENCEPHALITIS (G05.1*)	0.0	0.0	0.2	0.1
	B02.2	ZOSTER WITH OTHER NERVOUS SYSTEM INVOLVEMENT	0.0	0.0	1.0	0.4
	B02.3	ZOSTER OCULAR DISEASE	0.0	0.0	0.6	0.2
	B02.7	DISSEMINATED ZOSTER	0.4	0.0	0.2	0.2
	B02.8	ZOSTER WITH OTHER COMPLICATIONS	0.4	0.4	5.8	2.4
	B02.9	ZOSTER WITHOUT COMPLICATIONS	0.0	1.7	10.6	4.7
Total HOSP			1.2	2.6	24.3	10.6

RESULTS

The incidence of herpes zoster in the Świętokrzyskie voivodeship in 2013 by age groups is presented in Table I.

Table II presents the incidence (number of new cases/100,000) of herpes zoster in the Świętokrzyskie voivodeship in 2013 by detailed diagnosis (according to ICD-10) and by age.

Table III presents the incidence of herpes zoster and its types in the Świętokrzyskie voivodeship in 2013 by age group and healthcare type (per 100,000)

Proportions of total herpes zoster incidence rates (new cases) by types of healthcare received in the Świętokrzyskie voivodeship in 2013 are presented:

PHC/Hospitalisation – 27,1

AHC/Hospitalisation – 4,7

PHC/AHC – 5,8

Herpes zoster morbidity leading to hospitalisation in Poland in the years 2008-2012 by age group, based on NIZP-PZH data are presented in Figure 1.

To sum up, it could be assumed (based on the extrapolation of the results for the Świętokrzyskie voivodeship) that the mean incidence of herpes zoster in Poland is 338.8/100,000, and the highest rates are seen in the group of patients aged over 50 years (614.3/100,000). The incidence is 27 times higher for the primary healthcare compared with hospital care.

The highest number of complications, regardless of the healthcare type, is seen in the group of patients aged over 50 years.

The rates of hospital admissions related to herpes zoster, according to the NIZP-PZH data for five consecutive years, were similar for all age groups (mean 4.93-5.42/100,000; in the 0-19 years of age group: 0.10-1.50/100,000; in the 20-49 years of age group: 4.9-5.42/100,000; and in the > 50 years of age group: 9.99-13.37/100,000), although lower (particularly in the 50+ age group) than those based on the Świętokrzyskie voivodeship data (which probably resulted from differences in the methodology of data collection – official statistics and contract data).

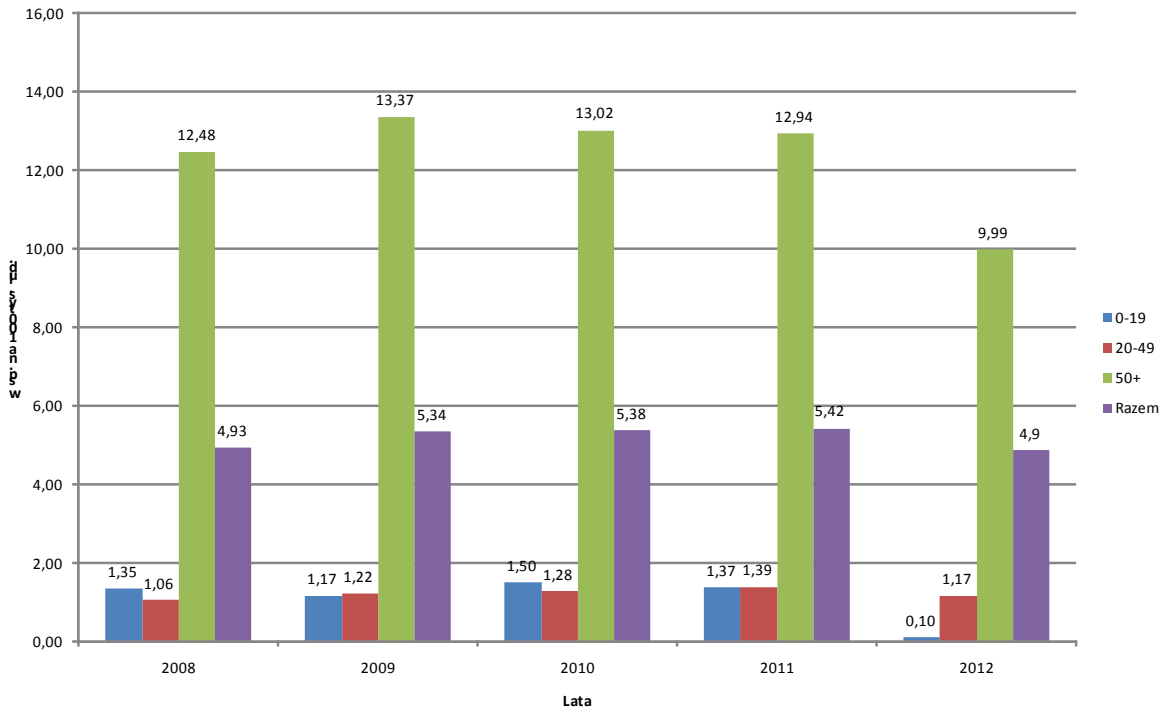

Fig. 1. In-hospital morbidity of herpes zoster in Poland in the years 2008-2012 by age groups

DISCUSSION

In this paper, we managed to show, with high likelihood, the real incidence of herpes zoster by age groups and by the disease for the Świętokrzyskie voivodeship, which – it appears – may be extrapolated for the whole country. Based on data for the Świętokrzyskie voivodeship as well as the NIZP-PZH data, we were able to determine the scale of hospitalisations related to herpes zoster both for the voivodeship in question and for the entire country.

What – in our opinion – is the advantage of this paper is the use of the NFZ data which make it possible to ascribe every diagnosis to a specific person (via the personal identification number PESEL) and see if the diagnosis is made again in the same year.

The mean incidence of herpes zoster for the Świętokrzyskie voivodeship (327.5/100,000) corresponds with the results reported by *Kawai K* et al. (11) in the systematic review of 2014 (300-500/100,000) and by *Pinchinat S* et al. (18) in the systematic review of 2013 (200-460/100,000) as well as the results reported by *Salares L* et al. (19) concerning Catalonia (427/100,000) and by *Studahl M* et al. (14) concerning Sweden.

A slightly lower than otherwise reported (considerably over 900 per 100,000) (11, 18, 19) is our rate of herpes zoster incidence in the Świętokrzyskie voivodeship population over 49 years of age (588.5/100,000). This may be related to a still different age structure of the Polish society compared with the "old EU countries".

The proportion of diagnoses for all healthcare types in favour of the primary healthcare reflects the fact that hospital admissions related to herpes zoster relate only to an insignificant percentage of all diagnoses (in our case, it was: in the group below 18 years of age: 1.2/100,000; in the group 18-49 years of age: 2.6/100,000; and in the group over 49 years of age: 24.3/100,000; mean 10.6/100,000) – in the systematic review by Kawai K et al. (11) the mean was 2-25/100,000, in an Italian paper concerning Tuscany the mean was 8/100,000 (20), and in Sweden the mean was 6.9/100,000 (14).

In Poland, the percentage of patients hospitalised (about 4%) is similar to that reported for Germany (2.7–3.7%) (13).

Hospital admission rates for the entire country are comparable with those reported in the literature and referred to above.

Our data show that with age the frequency of herpes zoster complications is increasing, and the most common complications include encephalitis, herpes zoster ophthalmicus, meningitis and other nervous system involvement. Proportions and rates similar to those observed in the Świętokrzyskie voivodeship are reported by investigators from Germany (13), Tuscany (20) and Sweden (14).

CONCLUSIONS

1. As we have shown, herpes zoster, particularly in persons aged over 50 years, in the ageing Polish society, constitutes – just like in other countries – a serious health problem associated with frequent use of both primary and ambulatory healthcare, as

well as numerous hospital admissions due to severe complications.
2. It appears that active immunisation against herpes zoster in the elderly would be beneficial from the perspective of both individuals and the society.

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