

Analysis of epidemiology of epilepsy in Podlaskie Province of Poland in the years 2002–2004

Analiza epidemiologii padaczki w województwie podlaskim w latach 2002–2004

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ABSTRACT

Epilepsy affects 8.2/1000 people in general population. In highly-industrial countries the prevalence of epilepsy ranges from 3–10/1000. Aim of study. The study objective was the epidemiological analysis of epilepsy in Podlaskie Province in the years 2002–2004. **Material and methods.** The study involved a group of 11 400 patients with epilepsy, inhabitants of Podlaskie Province, who in the years 2002–2004 were treated in health centers in Podlaskie. Another group consisted of patients hospitalized in neurological wards in the year 2004. **Results.** The prevalence of epilepsy in Podlaskie Province in 2002–2004 was 9.5/1 000 inhabitants. The study group included 44.78% women and 55.22% men. There were 23.95% children under 18 years of age and 76.05% over 18. In the group of patients hospitalized in neurological wards of Podlaskie in the year 2004, 34.3% subjects were admitted to hospital due to the first seizure, 50.9% patients due to a subsequent epileptic seizure, 9.87% had drug-resistant epilepsy and 4.93% were admitted to hospital because of the status epilepticus. Drug-resistant epilepsy occurs mainly in patients younger than 18 years, status epilepticus mostly refers to subjects over the age of 45. **Conclusions.** The prevalence of epilepsy in the population of Podlaskie Province does not differ much from the average rate reported from other European countries. In the study group, the involvement of both genders is almost identical, with a slight advantage of males. Hospitalizations due to first seizure, subsequent seizures and drug-resistant epilepsy were more frequent in children and adolescents, while admissions to hospital due to status epilepticus dominated in elderly.

Key words: epilepsy, status epilepticus, epidemiology

STRESZCZENIE

Rozpowszechnienie padaczki wynosi 8,2/1000 osób w ogólnej populacji. W krajach uprzemysłowionych chorobowość waha się w granicach 3–10/1000 mieszkańców. Celem pracy była analiza epidemiologiczna padaczki w województwie podlaskim w latach 2002–2004. **Materiał i metody.** Badaniem objęto 11400 osób z padaczką, mieszkańców województwa podlaskiego, którzy w latach 2002–2004 zgłosili się do zakładów opieki zdrowotnej. Oddzielnie analizowano grupę chorych hospitalizowanych w roku 2004 na oddziałach neurologicznych. **Wyniki.** Chorobowość z powodu padaczki w województwie podlaskim w latach 2002–2004 wynosiła 9,5/1000 mieszkańców. W badanej grupie kobiety stanowiły 44,8%, a mężczyźni 55,2%. Dzieci do 18 r.ż. stanowiły 23,95%, a osoby powyżej 18 r.ż. 76,05%. W grupie pacjentów hospitalizowanych w roku 2004, z powodu pierwszego napadu w szpitalach znalazło się 34,3% osób, w związku z kolejnym napadem 50,9%, z padaczką lekooporną 9,9%, a ze stanem padaczkowym 4,9%. Pacjenci z padaczką lekooporną to głównie dzieci poniżej 18 r.ż., a ze stanem padaczkowym po 45 r.ż. **Wnioski.** Chorobowość z powodu padaczki w województwie podlaskim w latach 2002–2004 nie różniła się istotnie od chorobowości w innych krajach europejskich. W badanej grupie udział obu płci był niemal równy z niewielką przewagą płci męskiej. Hospitalizacje z powodu pierwszego napadu, kolejnych napadów i napadów w padaczkach lekoopornych były zdecydowanie częstsze wśród dzieci i młodzieży, zaś przyjęcia z powodu stanu padaczkowego dominowały w grupie pacjentów w wieku starszym.

Słowa kluczowe: padaczka, stan padaczkowy, epidemiologia

Epilepsy is a pathological entity affecting people all over the world. Active form of epilepsy affects 8.2/1000 people in general population, on average [1]. According to data of Commission of Epidemiology and Prognosis International League Against Epilepsy from 1993 there are approximately 50 million epilepsy sufferers.

In highly-industrial countries the prevalence of epilepsy ranges from 3–10/1000 [2–4]. In the United States of America it accounts for 6–8/1000 [4,5], while in European countries e.g. in Italy 5.1/1000 [2], in the north of Sweden 5.5/1000 of adult population [6], and in Great Brit-

ain 6.3/1000 among the 23-year-old [7]. In well-developed countries the prevalence of epilepsy has been estimated to be 8–10/100000 inhabitants (WHO data). Pediatricians estimate that the mean prevalence of epilepsy among children in European countries accounts for 89–95/100000 [1,3].

Considerable differences are observed in epileptic cases between children and adults. The differences refer mainly to the frequency, etiology, seizure pattern, drug-resistance and prognosis [8–10]. Approximately, 50% of epilepsies have originated in childhood [11,12]. Some

researches have reported an additional increase in the incidence during the period of adolescence [13–15]. Sidenvall [16] believes that the highest incidence rate occurs among infants (420/1000000), and can be much higher (even 3206/100000) in the neonatal period. According to the latest reports, in developed countries 70% of newly diagnosed cases, both among children and adults, are treated effectively, the symptoms are well controlled and within 2–5 years the therapy can be withdrawn in 70% of children and in 60% of adults [3,10,17]. According to the latest report on the population of epileptics in Britain [18] 67.7% of cases respond well to the treatment applied. In patients with epilepsy in Poland remission was registered in about 30% [10]. However, in approximately 30% of cases the therapeutic effects are unsatisfactory. Sander [3] agrees that 20–30% of patients suffer from drug-resistant epilepsy, although among patients referred to hospital due to resistant epilepsy as many as 10–20% has either wrongly established diagnosis or inadequate treatment.

The status epilepticus with generalized tonic-clonic seizures occurs in 18–28 subjects/100000 of the general population become epileptic [19]. Status epilepticus is most common in infants and in the elderly, affecting more men than women [14,19]. In a study by Berg [14], during a five-year observation of children with diagnosed epilepsy, the status epilepticus occurred at least once in 9.5% of patients 2.5 years on average after epilepsy had been diagnosed. In the case of symptomatic epilepsy, 20% of seizures assume the form of the status epilepticus. Symptomatic epilepsy increases the risk of the status epilepticus in comparison with the idiopathic type.

AIM OF STUDY

The study objective was the epidemiological analysis of epilepsy in Podlaskie Province in the years 2002–2004 with regard to age, gender and reasons for hospitalization of epileptic patients in neurological wards.

MATERIAL AND METHODS

The study involved 11400 patients with epilepsy, inhabitants of Podlaskie Province, who in the years 2002–2004 were in health centers in Podlaskie. Data was obtained from Department of National Capital of the Health in Podlaskie Province. The study was designed and carried in the years 2002–2004. The study had the agreement of Bioethical Commission of Medical University in Białystok. The patients were divided according to gender and into age groups: under-18 and over-18. Then the groups were subdivided and the following age categories were distinguished: 0–1; 2–5; 6–9; 10–12; 13–15; 16–18 in the group of patients of developmental age and 19–25; 26–30; 31–35; 36–40; 41–45; 46–50; 51–55; 56–60 and above 60 in the group of adults.

Another group consisted of 446 patients hospitalized in neurological wards in Podlaskie Province in the year 2004. They were divided into patients admitted to hospital due to: the first seizure, subsequent epileptic seizure, drug-resistant epilepsy and status epilepticus. The age categories are identical with those for the years 2002–2004.

RESULTS

The analysis of 11400 cases of patients with epilepsy treated in the years 2002–2004 shows the prevalence 9.5/1000 inhabitants of Podlaskie Province.

The study group included 5105 (44.78%) women and 6295 (55.22%) men. There were 2730 children under 18 years old (23.95%) and 8670 over 18 (77.05%). In the under-18 group, girls accounted for 46.92%, boys for 53.08%. Among adults, women accounted for 44.11%, men for 55.89%.

Three peaks in the number of patients registered in health centers in the years 2002–2004 were observed in similar age groups both for women and men (Fig. 1.), i.e. 19–25 years, 46–50 years and above 60. The highest number of women suffering from epilepsy is found in the 19–25 age group (588), accounting for 11.52% of all female patients. In the same age interval, the number of men was 669, accounting for 10.63% of all male patients. The second peak in prevalence was noted in the age range of 46–50 years (7150; 11.36%), being higher among men as compared to women. Since the first days of life till the age of 19 the prevalence shows a steady increase. A rapid rise in the number of patients with epilepsy occurs after the age of 60 years.

The other group of patients consisted of 446 patients with epilepsy hospitalized in the neurological wards of Podlaskie Province in the year 2004, including 270 younger than 18 (60.54%) and 176 older than 18 years (39.46%) (Fig. 2).

Among all the patients with epilepsy treated in hospitals in Podlaskie Province in the year 2004, patients under 18 constitute the predominant group. The number of patients since birth till the age of 6 years grows rapidly, reaching in the 6–9 age group 14.13% of all hospitalized epileptics. After the age of 19, the number of hospitalized patients shows a steady decrease till the age of 36 and in the 36–40 age-group there are only seven patients (1.57%). Another increase in the number of hospitalized patients can be observed after the age of 60, accounting for 12.78% of all hospitalized epileptics in the year 2004.

A total of 153 subjects were admitted to hospital due to the first seizure, which accounts for 34.30% of all patients with diagnosed epilepsy in the neurological wards in Podlaskie. There were 227 (50.9%) patients hospitalized due to a subsequent epileptic seizure. Forty-four patients (9.87%) had drug-resistant epilepsy, 22 (4.93%) were admitted to hospital because of the status epilepticus.

The under-18 patients accounted for 63.40% of subjects hospitalized due to the first epileptic seizures. The number of patients admitted to hospital after the first attack shows a steady increase up to the age of 6, with the prevalence reaching 15.69% in the age range of 6–9 and 12.42% in the 16–18 age groups. After the age of 18 the number of hospitalized patients due to the first seizure decreases and a subsequent increase is noted in the age intervals of 41–45 and 46–50 years. The last increase in the number of patients with the first epileptic seizures can be observed in people older than 60 (14.38%). The fewest patients after the first seizure are found in the age range of 36–40 and 56–60 years (Fig. 3).

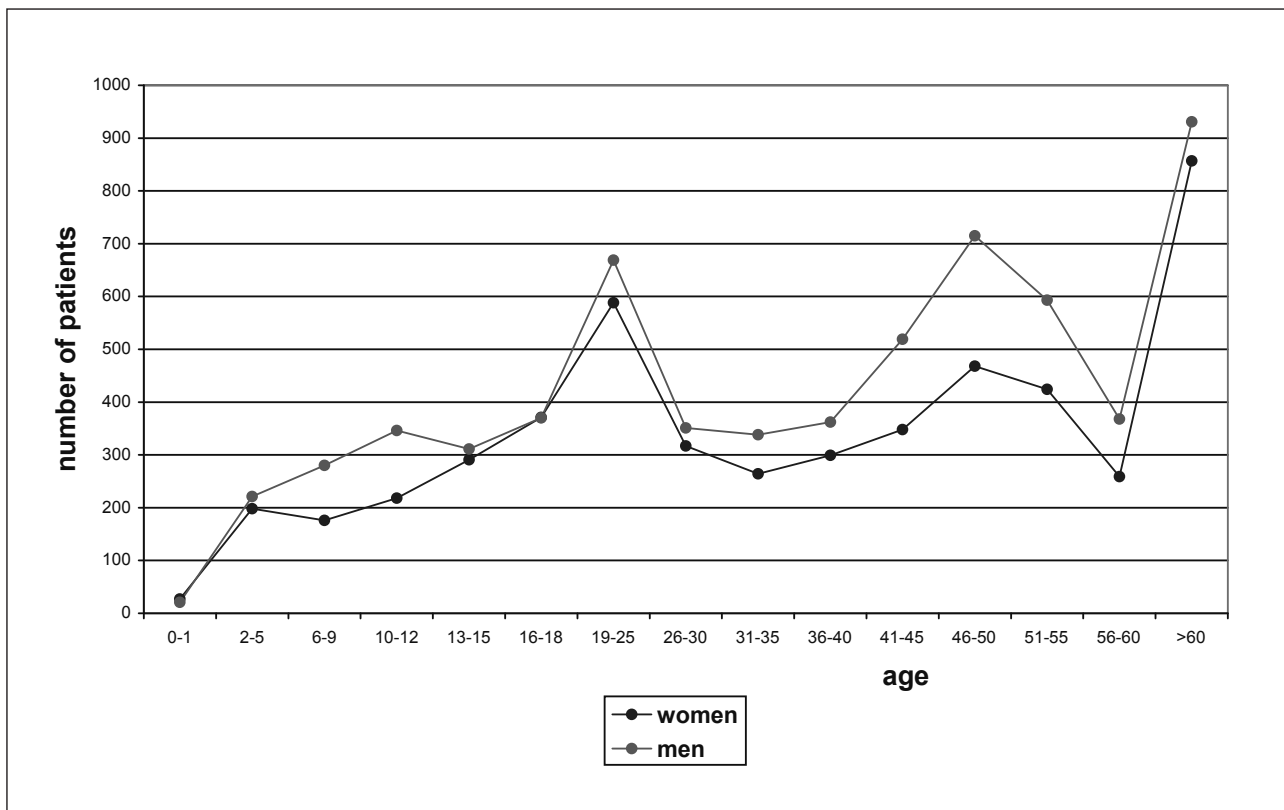


Fig. 1. The number of patients with epilepsy registered in health centers in the years 2002–2004 in Podlaskie Province in Poland
Ilość pacjentów z padaczką zarejestrowanych w jednostkach opieki zdrowotnej województwa podlaskiego w latach 2002–2004

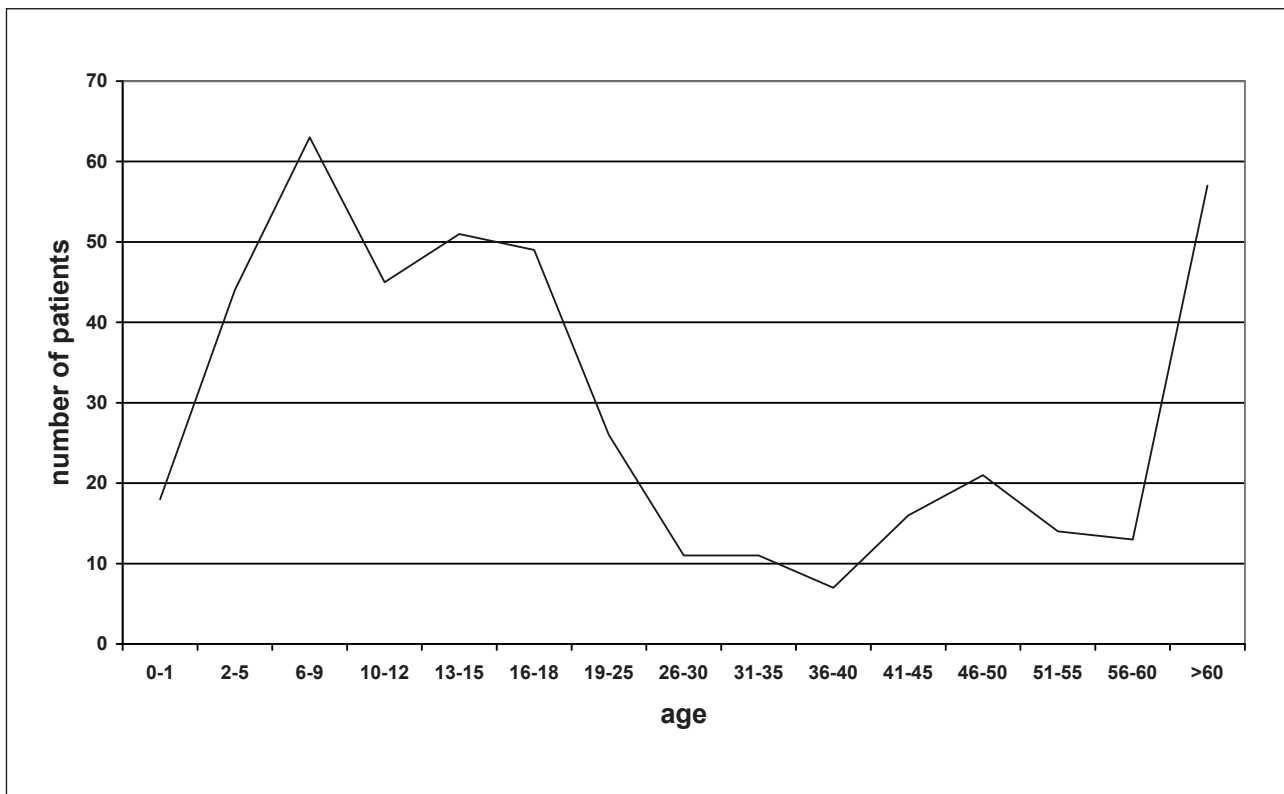


Fig. 2. The number of patients with epilepsy hospitalized in neurological wards of Podlaskie Province in Poland in the year 2004
Ilość pacjentów z padaczką hospitalizowanych w oddziałach neurologicznych województwa podlaskiego w roku 2004

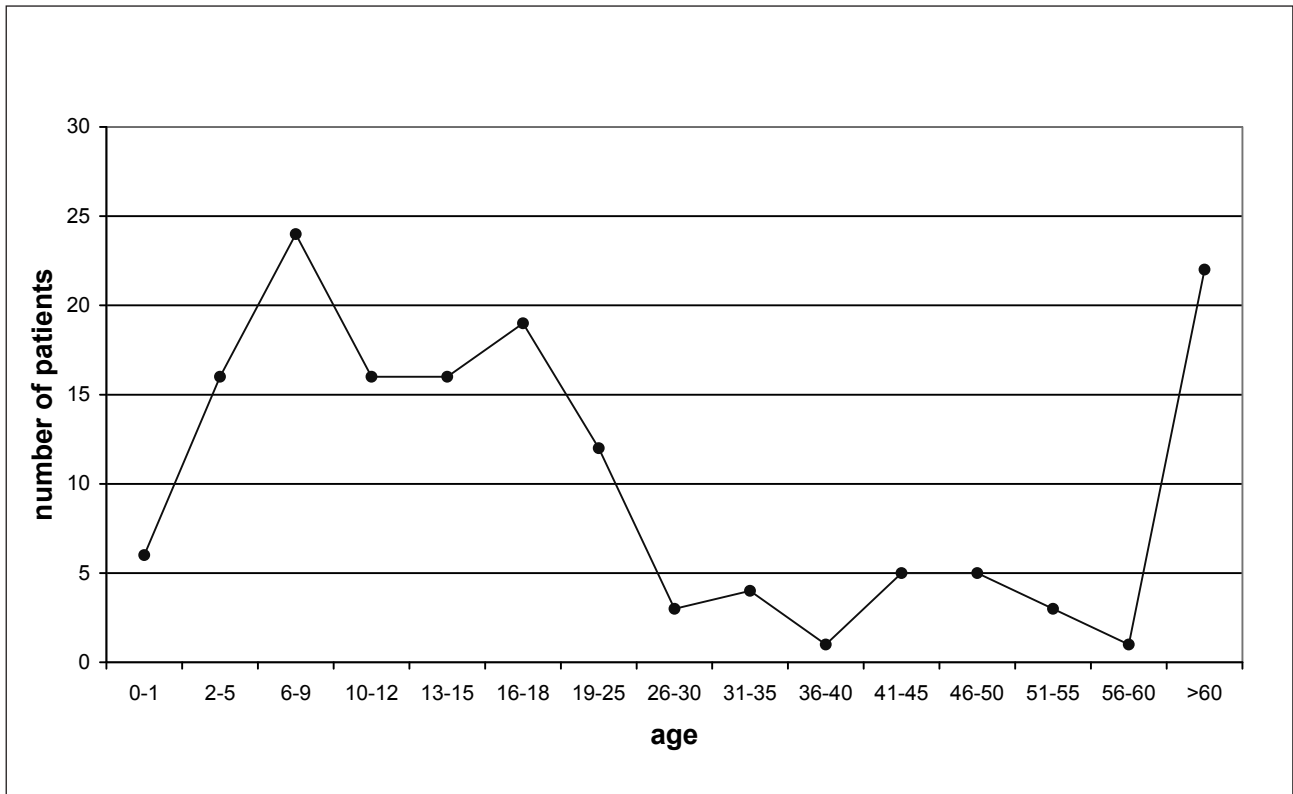


Fig. 3. The number of patients with epilepsy hospitalized due to the first seizure in Podlaskie Province in Poland in the year 2004
Ilość pacjentów z padaczką hospitalizowanych w województwie podlaskim w roku 2004 z powodu pierwszego napadu

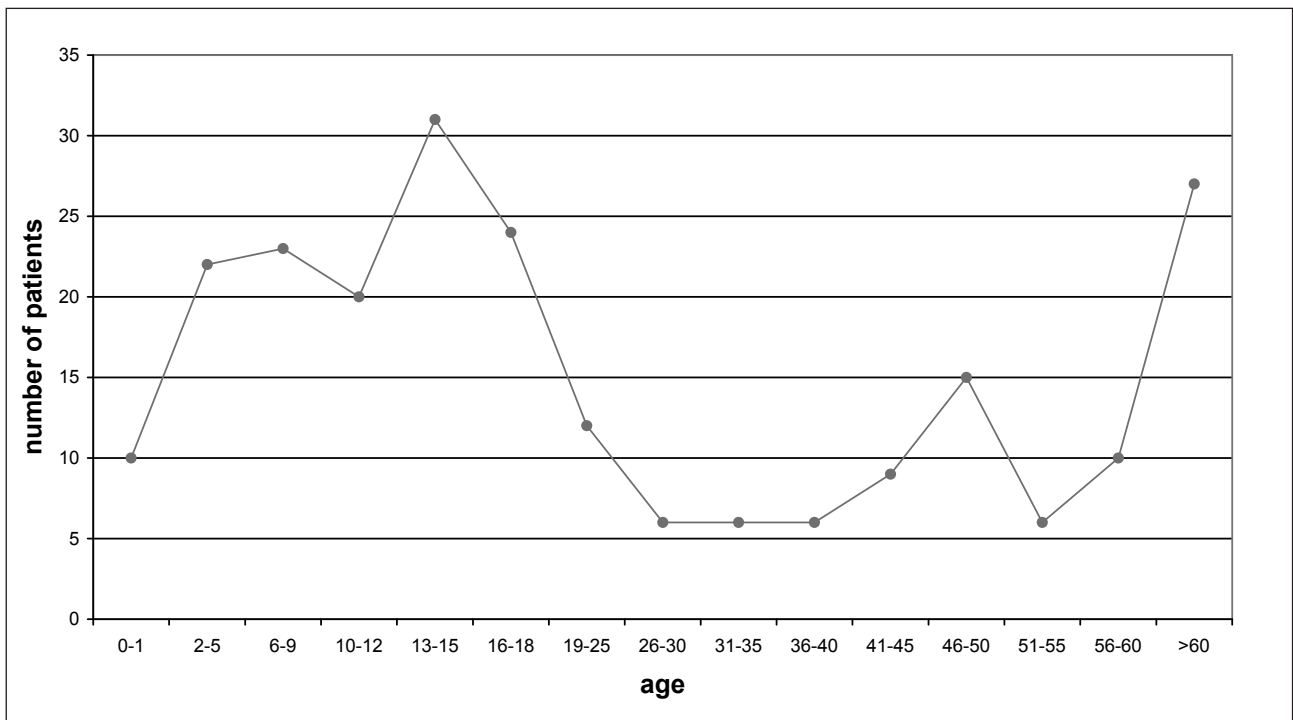


Fig. 4. The number of patients with epilepsy hospitalized due to subsequent epileptic seizure in Podlaskie Province in Poland in the year 2004
Ilość pacjentów z padaczką hospitalizowanych w województwie podlaskim w roku 2004 z powodu kolejnego napadu

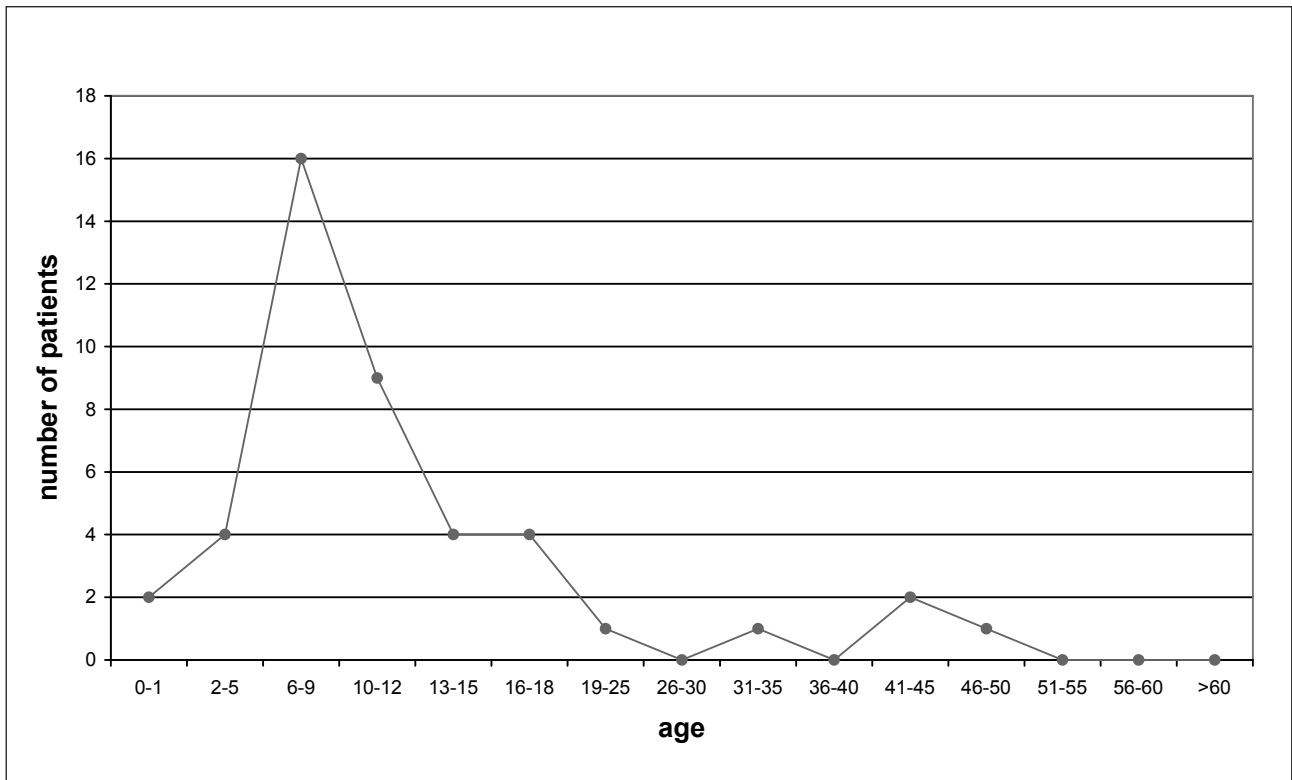


Fig. 5. The number of patients with epilepsy hospitalized due to drug- resistance epilepsy in Podlaskie Province in Poland in the year 2004 *Ilość pacjentów z padaczką hospitalizowanych w województwie podlaskim w roku 2004 z powodu padaczki lekoopornej*

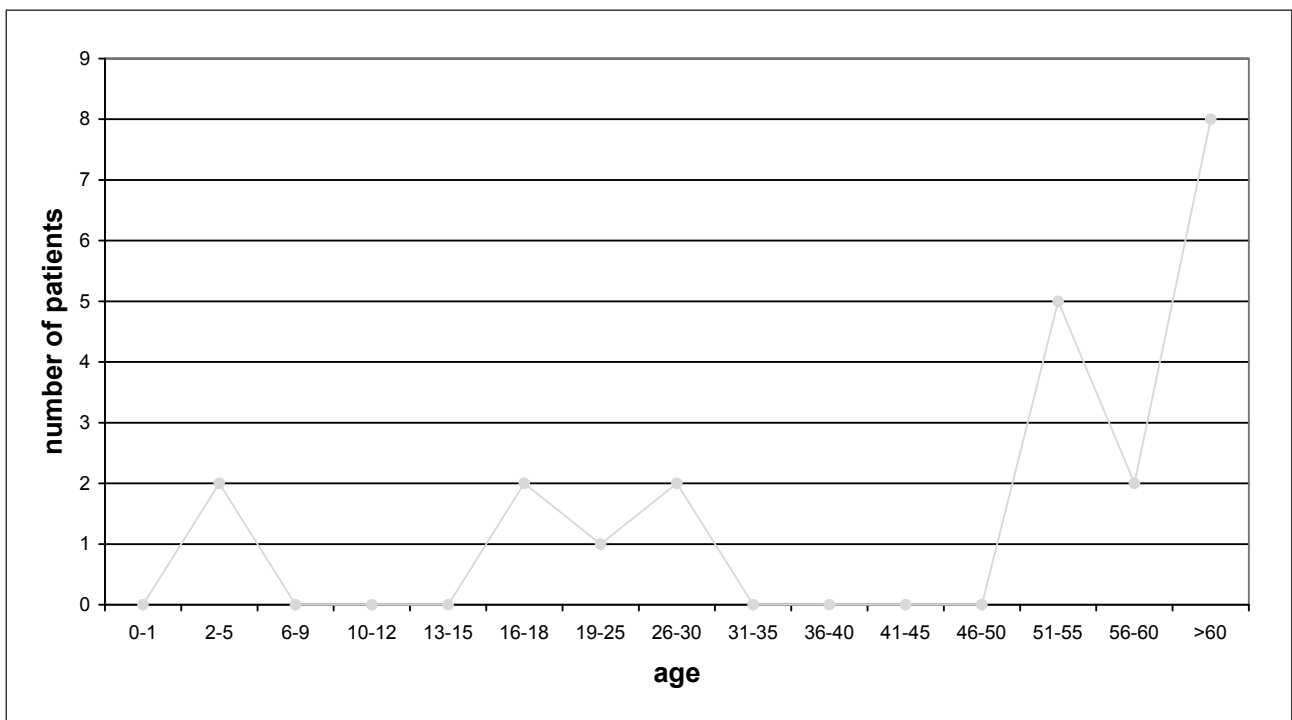


Fig. 6. The number of patients with epilepsy hospitalized due to status epilepticus in Podlaskie Province in Poland in the year 2004 *Ilość pacjentów z padaczką hospitalizowanych w województwie podlaskim w roku 2004 z powodu stanu padaczkowego*

Subsequent seizure was the cause of hospitalization mainly in the under-18 patients, accounting for 57.27% of all patients hospitalized for this reason. There are two prevalence peaks noted in this age interval (i.e. up to the age of 18). The first is observed between the ages of 6–9 (10.13%). The second occurs in the age range of 13–15 years (13.66%), being the highest prevalence rate among all the patients hospitalized due to subsequent seizure in the year 2004. An increase in the number of patients hospitalized due to subsequent seizure is also noted in the age group of 46–50 (6.61%) and later in patients older than 60 years (Fig. 4).

Drug-resistant epilepsy occurs mainly in patients younger than 18 years (88.64% of the total number of patients with drug-resistant epilepsy). The number of these patients shows a constant increase up to the age of 6–9 (36.36%). Since the age of 9, the number of patients with drug-resistant epilepsy decreases steadily, reaching zero after the age of 51 (Fig. 5).

The status epilepticus mostly refers to subjects over the age of 45 years. The peak of hospitalizations occurs within the range of 51–55 years (22.73% of patients with the epileptic state). Single cases of the status epilepticus can be observed in the age range of 2–5 and 16–30 years. However, in the age intervals of 0–1, 6–15 and 31–46 no case of the status epilepticus were noted (Fig. 6).

DISCUSSION

The prevalence of epilepsy in the population of Podlaskie Province in the years 2002–2004 has been estimated in our study at 9.5/1000, which does not differ much from the average rate reported from other European countries [5–7,18,21].

In the study group, the involvement of both genders is almost identical, with a slight advantage of males (55.22%). A slightly higher number of epileptic men than women is typical of this disease and has been confirmed in the majority of researches carried out all over the world in different populations and at various age [7,11,12,20–23].

In the current study group of epileptic patients, adults are the predominant group. Subjects under 18 account for 23.95%. This can be associated with a demographic situation in Poland, characterized by a constant drop in birth rate since 1985. Between the years 1983 and 2003 the birth rate decreased by half. The population over 60-years old in Poland in 2003 accounted for 16.6%, being almost the same as the number of subjects under 14 (16.7%) of all inhabitants in Poland). Approximately 70% of the society is 15–60 years old. The demographic explosion of the years 1979–85 has just entered the adulthood. This data is reflected in our study, where the highest incidence was observed in the age group of 16–30, i.e. among those born during demographic explosion. The second climax refers to the subjects aged 41–50 and also in this case more men than women are affected. The rise in incidence in this age interval is associated with increased incidence of symptomatic epilepsy. It adulthood rise the causes of symptomatic epilepsy due to tumors, cardiovascular diseases, injuries. Therefore, the increased incidence rate of epilepsy, first of

all, refers to male gender. Alcohol addiction, apart from its direct action, increases frequency of traumas. Bryniarska and Zakrzewska [22] emphasize an important role of alcohol addiction as an etiologic factor of epilepsy. The last increase in the incidence of epilepsy refers to people older than 60 and is likely to be associated with increased incidence of cardiovascular diseases resulting in strokes. A similar increase has been reported worldwide [18]. This increase may become even more significant due to the aging tendency observed in Poland and in other European societies. The epidemiological studies carried out in Great Britain and in the United States have revealed that currently almost 25% of the first epileptic seizures affect the elderly above 60 years of age [3,24] Sander [3] also emphasizes a change in the incidence in the respective age groups, referring to the decreased incidence rate in younger groups and increased rate in the over-60 group. In Europe, the incidence of epilepsy in the respective age groups is estimated at 70/100000 for the under-19, 30/100000 for the group of 20–64 years old, being the highest over the age of 65 (100/100000) [21].

The second group involved in the current study consisted of all epileptic patients hospitalized in neurological wards in Podlaskie Province in the year 2004. The under-18 patients accounted for as many as 60.54% of the hospitalized patients, which seems to be consistent with world tendencies, according to which epilepsy climax occurs in childhood. Many authors [9,11,12,23,25] suggest that the first symptoms of epilepsy develop among children and adolescents. In a study conducted by Majkowski et al. [12], the majority of patients were 6–25 years old, which accounted for 51.3% of epileptics. In our study, the highest prevalence was noted under the age of 6, in adolescents and in the old age. The maxima of patients hospitalized due to epilepsy were located in the same age ranges. Various factors may condition the increased prevalence rate in adolescents. Firstly, changes that occur during maturation are mainly due to hormonal disturbances. Maturation also involves changes in the mentality of a young person and is associated with various models of behavior. At this age, people often ignore hygienic lifestyle, sleep less and fall asleep at a different time. They do not pay much attention to regular medication. New factors that may induce epileptic seizures may appear, e.g. at the disco. Some of them have the first contact with alcohol and drugs. Many authors mention these factors as the etiology of pseudo-drug-resistant epilepsy.

After the age of 18, the number of hospitalized patients in our study shows a constant decrease and reaches the minimum in the age interval of 36–40 years. The next slight increase is noted in the age interval of 46–50, probably due to the already mentioned risk factors (traumas, alcohol) and higher prevalence of organic diseases of the brain e.g. neoplasms. Many authors report the increased incidence of epilepsy at the mature age of about 50 [12,22,26,27]. According to Bryniarska and Zakrzewska [22], the mean age of adult epileptic person is 57 years, being the highest in male patients aged 51–60 and among females older than 70. However, Majkowski [12] suggests another distribu-

tion – two maxima are found in the age ranges of 21–30 and 41–50 years. In long-lasting studies conducted by Hauser [5,8], no climax is observed at mature age and the first increase in the number of patients occurs after the age of 60.

The predominance of subjects younger than 18 among the hospitalized epileptic patients is consistent with many other findings [12,25]. This seems to be associated with the fact that the first epileptic seizure usually occurs in childhood, when detectability is the highest. In the study conducted by Moran et al. [18], the first seizure in the under-19 age group was observed in 46.4%. Another rise in the number of hospitalized patients due to the first epileptic seizure occurred after the age of 46, which is associated with the increased incidence of organic diseases of the central nervous system. In a study carried out in the north of Sweden, in more than half of patients with epilepsy the first seizure occurred before the age of 20 (54.4%), in 5.2% of patients it was observed in the first year of life and in 9.3% of those older than 60. Our findings seem to be confirmed by a study performed in Italy [2], in which in 60.9% of patients the first epileptic seizure took place before the age of 19, including 37.3% of patients under 9. According to Michałowicz [15], the first epileptic seizure occurred in 30% of patients before the age of 4, in 50% before the age of 14 and in 2% after the age of 50.

The number of patients under the age of 18 hospitalized due to a subsequent epileptic seizure is high in our study. The increase in the number of patients with a subsequent epileptic seizure in patients older than 45 is associated with the increased number of patients with epilepsy of organic origin accompanied by permanent brain damage with neurological deficit, in which the risk of subsequent seizure is higher than in the case of idiopathic epilepsy and the likelihood of spontaneous remission is very small. Patients who developed the first seizures in childhood have better prognosis of complete remission after therapy withdrawal.

Among the patients hospitalized due to drug-resistant epilepsy, as many as 88.64% are young. The increase in the number of these patients under the age of 6 is associated with the occurrence of epilepsies considered to be drug-resistant or difficult to treat at this age (syndromes of West, Lennox-Gastaut, Rasmussen encephalopathy). These syndromes are burdened with a high risk of seizure recurrence, severe complications and frequently accompanied

by mental and/or physical retardation [13,15,25]. Prognosis in these syndromes is unfavorable and this is probably the reason why the incidence rate of drug-resistant epilepsy shows a constant decrease in adulthood [8,18].

Patients older than 50 years constitute the main group with the status epilepticus. In our study 68.18% of all patients had status epilepticus. Single cases can be found in the age groups of 2–5 and 16–30 years. This can also be related to the occurrence of epileptic syndromes regarded as drug-resistant and burdened with higher risk of the status epilepticus. Many authors point at the occurrence of the status epilepticus in the elderly and very old patients [19,28–30]. One third of the epileptic seizures in people older than 75 is of status epilepticus nature. This is very important as the status epilepticus in the elderly lasts longer and is burdened with higher mortality than in the young. According to Towne [29], the number of epileptic patients who have experienced an status epilepticus grows rapidly after the age of 50, and thus, in the age range of 60–69 patients with the status epilepticus account for 36% of all the patients with this ailment. In a study conducted in the Department of Neurology in Lublin [30] 28% of the patients with status epilepticus were within the age range of 17–30, 32% at the age of 31–50, while 40% were 50 or over. A similar distribution of the number of patients has been presented by DeLorenzo [13], who reported a slight increase in the incidence rate under the age of 1 year, then a drop and another increase after the age of 29. The maximum number of patients with the status epilepticus falls within the age range of 60–79 and the patients at this age account for 33% of all patients with this condition. Mortality rate due to the epileptic state is markedly higher in patients older than 60.

CONCLUSIONS

The prevalence of epilepsy in the population of Podlaskie Province at 9.5/1000 is similar to rate reported from other European countries. In the study group, the involvement of both genders is almost identical, with a slight advantage of males. Hospitalizations due to first seizure, subsequent seizures and drug-resistant epilepsy were more frequent in children and adolescents, while admissions to hospital due to status epilepticus dominated in elderly.

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