Seizure 2002; **11**: 397–401
doi:10.1053/seiz.2001.0665, available online at http://www.idealibrary.com on IDEAL®

Epilepsy prevalence in a rural area in Istanbul*

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İSTANBUL'DA BİR KIRSAL ALANDA EPİLEPSİ PREVALANSI**

ÖZET

Bu çalışma İstanbul-Küçükçekmece Bölgesi'nde Haziran 1999 – Şubat 2000 tarihlerinde gerçekleştirilmiş kesitsel ve vaka kontrollu bir alan çalışmasıdır. Bölgede basit rastlantısal örnekleme yöntemi ile seçilen evler ($n = 493$) tek tek gezilerek anket yöntemi ile bireylerden ($n = 2187$) % 2.65 inin *epilepsi şüpheli* olduğu ($n = 58$) saptandı. Öykü alma, nörolojik muayene ve EEG den yararlanılarak *epilepsi* tanısı alanlar ($n = 17$) belirlendi. Yaşamboyu Epilepsi Prevalansı % 0.8 idi. 17 epilepsili olgudan % 41.2 ($n = 7$) si parsiyel, % 47.0 ($n = 8$) si jeneralize, % 11.8 ($n = 2$) i fokal ya da jeneralize olduğu belirlenemeyen epilepsi idi. Epilepsili bireyler ile aynı bölgeden oluşturulan kontrol grubunda ($n = 125$) epilepsi ile ilgili risk faktörleri Lojistik Regresyon Analizi ile araştırıldı. Öğrenim durumu (Odds Ratio = 1.82, % 95 Güven Aralığı = 1.13–2.94, $P = 0.01$), meslek (OR = 0.76, % 95 GA = 0.60–0.97, $P = 0.03$), ailede epilepsili birey olması(OR = 0.67, % 95 GA = 0.47–0.94, $P = 0.02$) ile epilepsi arasında istatistik anlamlılık verecek derecede ilişki olduğu saptandı. Sonuçlar bireylerin epilepsi konusunda bilgilendirilmesi gerekliliğine dikkat çekmektedir.

Anahtar Kelimeler: Nöroepidemiyoloji, epilepsi, tarama.

****Bu çalışma İstanbul Tıp Fakültesi Araştırma Fonu tarafından T – 693 / 280699 nolu proje olarak desteklenmiştir.

This study is a field study with cross-section and case control conducted in the Kucukcekmece Region of Istanbul between June 1999 and February 2000. Four hundred and ninety three dwellings selected by a simple random sampling method were visited. From a population of 2187, 58 people, after filling in a questionnaire were suspected to have epilepsy. Following an interview, neurological examination and an electroencephalogram (EEG) 17 were diagnosed as having epilepsy. Lifetime epilepsy prevalence was 0.8%. 41.2% of the 17 epilepsy cases had partial epilepsy ($n = 7$), 47.0% had generalized ($n = 8$) and in 11.8% seizures could not be classified ($n = 2$). The risk factors for epilepsy in the control group ($n = 125$) from the same region and those with epilepsy were investigated by means of logistic regression analyses. Educational status (odds ratio : 1.82, 95% confidence interval : 1.13–2.94; $P = 0.01$), profession (OR : 0.76, 95% CI : 0.60–0.97; $P = 0.03$), history of epilepsy in the family (OR : 0.67, 95% CI : 0.47–0.94; $P = 0.02$) were determined to be correlated with epilepsy. The results have drawn attention to the fact that individuals should be informed about epilepsy.

Key words: neuro-epidemiology; epilepsy; screening.

INTRODUCTION

Epilepsy is a clinical phenomenon beyond national and racial limits, which has specifically regional as well as worldwide characteristics, and is found in all populations on Earth[1]. Its specific characteristics in developing countries need to be evaluated separately.

According to the results of several studies on its prevalence in developed and developing countries, epilepsy prevalence ranges between 0.3 and 5%[1–3]. The World Health Organization (WHO) has proposed to investigate the aetiology of epilepsy, which may vary regionally, with the social structure of the society, cultural beliefs about the disease and their impacts on treatment, besides carrying out further studies of its prevalence[1,2,4,5].

As epilepsy is a chronic disease its prevalence tends to rise, despite a lower incidence. Thus, preva-

*This study was presented as a poster at the 'Congress of Epidemiology 2001' in Toronto, 13–16 June 2001.

lence investigations are conducted cross-sectionally in smaller populations than necessary for the studies of incidence, and such investigations are preferable in developing countries[1]. According to the results of previous studies, epilepsy prevalence is closely related to multiple variables such as age, region, gender, heredity, disease histories in childhood, traffic accidents, trauma and intoxication, vascular diseases like arterio-venous malformations and aneurysms, tumours, degenerative neurological disorders and toxic causes, like alcohol[6–23]. The present study aimed to determine the relationship between epilepsy prevalence and its risk factors in Kucukcekmece, an intermediate rural to urban settlement in Istanbul.

METHOD

This was a cross-sectional field study conducted between 28 June 1999 and 29 February 2000. It was performed in Kucukcekmece Department of Training, Education and Health. The scope included a population of 65.049 registered in eight primary healthcare centres in the region by means of household registration forms (HRF)[24].

In the study, the least sampling magnitude has been determined as 1522 with the deviation not more than $\pm 0.5\%$, as the expected reliability and the highest epilepsy prevalence to be 95 and 1%, respectively[25]. The houses ($n = 493$) selected by means of simple random sampling method were visited by trained midwives working in the region.

The questionnaire they used (form I) was developed in a pilot-study, by making use of WHO's proposals and previous epidemiological investigations[1,4] to determine epilepsy prevalence in the field study, and filled in by face-to-face interviews.

Individuals suspected to have epilepsy, through completing the form, were invited to Istanbul medical faculty. Here form II was filled in by face-to-face interview with the participants. The participants were neurologically examined and their EEGs recorded. *Active epilepsy* prevalence was determined in patients with an epilepsy history, who had an anticonvulsant treatment and had experienced at least one single seizure in the past 5 years. *Lifetime epilepsy prevalence* was recorded in those patients who had even had one single epileptic seizure[1,13,27]. The seizure types were described as generalized, partial or unclassified according to the ILAE classification after neurological and EEG examinations[4,9,27]. In order to analyse the information obtained from form II relating to the individuals with epilepsy, a control group, consisting of 125 healthy participants from the same region, was established.

The data obtained were evaluated using the chi-square test, Fisher exact test and logistic regression analysis[25].

RESULTS

The study included 493 houses in whom 2187 people dwelt: 50.3% male ($n = 1100$) and 49.7% female ($n = 1087$). The distribution of individuals according to age groups and gender is shown in Table 1. The results of form I demonstrated that 58 individuals had been suspected to have an active epileptic seizure history, and 37 of them came to the appointments. The results of form II, neurological examinations and EEGs showed that 14 individuals had had previous febrile convulsions, six had conversion disorders and 17 had active epilepsy. Thus the lifetime epilepsy prevalence was determined to be 0.78% in all age groups (95% CI : 0.0045–0.0124). Of the individuals with epilepsy 11 were male and six were female. The lifetime epilepsy prevalence was 1.0% in males and 0.55% in females. Of 17 cases with epilepsy seven had partial epilepsy, eight had generalized epilepsy and two were unclassified. Thirteen individuals with epilepsy stated that they had had at least one seizure in the last year. So, the active epilepsy prevalence for 1 year was 0.59% (95% CI : 0.0032–0.0101).

Table 1: The distribution of individuals according to age and gender.

Age/gender	Male		Female		Total	
	n	%	*N*	%	*n*	%
0–9	253	50.4 (23.0)*	249	49.6 (22.9)	502	100.0 (23.0)
10–19	198	49.4 (18.0)	203	50.6 (18.7)	401	100.0 (18.3)
20–29	280	57.0 (25.5)	211	43.0 (19.4)	491	100.0 (22.5)
30–39	159	44.7 (14.5)	197	55.3 (18.1)	356	100.0 (16.3)
40–49	101	47.6 (9.2)	111	52.4 (10.2)	212	100.0 (9.7)
50–59	66	49.6 (6.0)	67	50.4 (6.2)	133	100.0 (6.1)
60–69	31	49.2 (2.8)	32	50.8 (2.9)	63	100.0 (2.9)
70–79	9	39.1 (0.8)	14	60.9 (1.3)	23	100.0 (1.1)
80–89	2	50.0 (0.2)	2	50.0 (0.2)	4	100.0 (0.2)
90–99	1	50.0 (0.1)	1	50.0 (0.1)	2	100.0 (0.1)
Total	1100	50.3 (100.0)	1087	49.7 (100.0)	2187	100.0 (100.0)

The distribution of healthy and with-epilepsy individuals according to age, gender, educational

status, profession, region, consanguineous parents or with an epilepsy history in their families is shown in Table 2.

The results of logistic regression analysis that compared the characteristics of healthy and with-epilepsy individuals for age, gender, educational status, profession, region, consanguineous parents and epilepsy history in their families as independent variables and presence/non-existence of epilepsy as dependent variables, are shown in Table 3.

There is a statistically significant correlation of epilepsy with educational status, profession and history of epilepsy in family members. The ratio of illiteracy in individuals with epilepsy is higher than those without it. And the ratio of unemployed individuals with epilepsy is higher than in those who do not have it. A family history of epilepsy is more likely in those with epilepsy, than in the non-epileptic contingent. 17.6% of individuals with epilepsy had at least one person with epilepsy in their families whilst only 3.2% of non-affected individuals had. The difference was statistically significant (Fisher exact test, $P = 0.037$).

Epilepsy is present most frequently in the 019 years age group (47% of the cases); although it is not statistically significant, it draws attention that frequency diminishes with age. Of the individuals with epilepsy 64.7% were male and 35.3% were females.

DISCUSSION AND CONCLUSION

Epilepsy prevalence may be different in developed and developing countries and is generally found to be four to six times higher in developing countries than developed ones[1].

Active epilepsy prevalence for 1 year in South America is 11.5/1000, (12.3/1000 for males and 10.8/1000 for females)[4]. As per various studies in Africa, the highest ratios of lifetime epilepsy prevalences are 37/1000 in Nigeria and 43/1000 in Liberia; and the related lowest ratios are 5.3/1000 in Nigeria and 5.2/1000 in Ethiopia[4]. Prevalence is higher in rural areas compared to urban; the predominance of the male sex is not statistically significant; and in general, this disease is seen more frequently in those under 10 years old. Lifetime epilepsy prevalences in Asia are 9.02/1000 in Sri Lanka, 9.99/1000 in Pakistan, 4.4/1000 in China, 1.5/1000 in Japan[4], more frequent in rural areas, and the gender distribution is almost equal. Almost half of the observed cases are in the first and second decades.

The fact that prevalence ratios are higher in developing countries is related to a younger population structure, socio-economical factors and different aetiological factors in different countries[1].

The results of previous studies in Turkey, conducted by the same methods (door-to-door screening, comprehensive questionnaire forms and neurological examinations) were similar to ours. Lifetime epilepsy prevalence for all age groups in Central Anatolia was 0.7% (0.45% in the city, 0.87% in the town)[26]. In a Pakistan–Turkey joint study, lifetime epilepsy prevalences for all ages in the Central Anatolia region of Turkey and in Pakistan were found to be 0.7 and 0.98%, respectively (the prevalence values in both countries are two-folds higher in rural areas)[27].

The lifetime epilepsy prevalence in a study performed in a district of Sivas City was 0.93%[28]. Ozdemir[29] found the prevalence to be 1.73% in his study in the rural areas of Sivas. In another study in Sivas City centre, it was 0.61%[30].

Generalized tonic–clonic seizures have been stated to be more frequent in developing countries while complex partial seizures have been shown to be more common in studies conducted in industrialized countries[5,9]. Tonic–clonic seizures are more easily classified without EEG records. Therefore, this type of seizure has been found more frequently in many studies (67–86.4%)[4,5]. In a study in Tunisia, the most frequent type of seizure was a generalized convulsive seizure (93%)[3]. In Central Anatolia[26], the generalized seizures were observed most frequently (79%) as in the prevalence studies performed in Pakistan and Turkey where generalized tonic–clonic seizures were the most frequently reported type of seizure (77 and 76%, respectively)[27].

In this study, 41.2% of seizures were partial, 47.0% were generalized and 11.8% were undetermined.

Epilepsy prevalence increases with age[9,10]. Epilepsy prevalence in those below 10 years old (and in the first two decades according to some studies) is higher than in other age groups[4,10,31]. A study in Tunisia demonstrated that prevalence increased with age and that the highest prevalence was reached by the age of 20 years[3]. In a study in Ecuador, the highest epilepsy prevalence was found in the 1019 years age group[11].

In a Turkish study the first seizure had taken place in the 04 years age group in 42% of the patients and in the first decade in 49.3% of them[26]. In another Turkish study the epilepsy had started in the first decade in 41% and in the second in 31% of the cases[32]. And in another[29], 59% of the cases were below 10 years old and 73% were 20 years old and below. In the Siva city study the specific prevalence of individuals with active epilepsy according to age was highest in the 1019 years age group[30]. In our study, epilepsy was present most frequently in the 019 years age group too.

Another study has shown that the risk for seizures is increased in individuals whose parents had a history of epilepsy[12]. In a study of epilepsy incidence in

Table 2: The features of healthy individuals and those with epilepsy.

	With epilepsy ($n = 17$)	Healthy ($n = 125$)		With epilepsy ($n = 17$)	Healthy ($n = 125$)
Age group			Profession		
0–9	4	54	House wife	2	30
10–19	4	18	Worker	4	14
20–29	3	16	Self-employed	0	7
30–39	3	15	Retired	0	6
40–49	2	12	Unemployed	6	4
50–59	1	4	Student	3	27
60–69	0	6	0–6 age group	2	37
Gender			Region		
Male	11	61	Marmara	2	19
Female	6	64	Aegean	0	2
Education			Mediterranean	0	5
Pre-school	2	37	Black Sea	9	50
Illiterate	4	11	Central	2	12
Literate	1	6	East	4	37
Primary school	9	60	Epilepsy history in the family		
High school	1	9	No	14	121
University	0	2	Father	0	3
Consanguineous parents			Aunt	1	0
Yes	3	16	Uncle	2	0
No	14	109	Elder brother	0	1

Table 3: Logistic regression analysis.

Independent variables	β	Significance	Exp. (β)	Exp. for (β) 95% GA lower	Exp. for (β) 95% GA upper
Consanguineous parents	0.3146	0.7099	1.3697	0.2612	7.1835
Epilepsy history in the family	0.3956	0.0242	0.6733	0.4774	0.9496
Gender	0.6696	0.3156	1.9534	0.5283	7.2226
Regions	0.0595	0.7498	1.0613	0.7363	1.5297
Profession	0.2629	0.0333	0.7688	0.6035	0.9794
Educational status	0.6032	0.0132	1.8279	1.1343	2.9458
Age group	0.1236	0.5265	1.1315	0.7720	1.6586
Constant	0.7148	0.7911	—	—	—

Ethiopia, 22% of those with epilepsy had a family history of epilepsy[31]. In another study, it was stated that the children who had major motor epilepsy in their families had an increased chance of developing epilepsy[15]. In a Turkish study[26] there was at least one epilepsy incidence among the close relatives of 27% of the cases[26]. Similarly, 17.6% of those with epilepsy had at least one relative with epilepsy.

In one study[2], the parents of 41.89% of the patients with epilepsy were consanguineous. In families without epilepsy 22.96% were consanguineous. In another study[33] there was no statistically significant difference between epilepsy and control and parental consanguinity, as in the present study.

Consequently, the lifetime epilepsy prevalence of 0.8% determined in this study region is consistent with our local studies and similar to those in some developed and developing countries. Other indicators such as male predominance as well as increased prevalence in the 019 years age group are consistent with many other local and international studies. We could not determine any relationships between epilepsy and consanguineous parents, similar to most other local studies. The existence of an individual with epilepsy in the family increases the risk for epilepsy, as is also found in many local and international studies.

We concluded that the numbers of uneducated and unemployed individuals among those with epilepsy were higher and the frequency of epilepsy in people having a history of epilepsy in their families is greater than for those who do not.

The results of the study made us realize that we should prepare some programmes in order to inform the community about epilepsy, particularly those with a family history of epilepsy, and to support people with epilepsy to be better educated and to gain employment.

ACKNOWLEDGEMENTS

This work was supported by the Research Fund of the University of Istanbul, project number: T–693/280699.

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