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Epilepsy in intellectual disability: Gender differences in Moroccan patients

Yousra Benmakhlouf[1*], Amina Barakat[1] , Naima Ghailani Nourouti[1], Mohcine Bennani Mechita[1]

Biomedical Genomics and Oncogenetics Research Laboratory, Faculty of Sciences and Techniques, University Abdelmalek Essaadi, Tangier, Morocco

Abstract

Epilepsy is a common neurologic disorder and the most common feature affecting people with intellectual disability (ID). Our work aimed to evaluate the occurrence of epilepsy in ID patients in relation to gender, etiology of ID and medication of epilepsy among patients with ID aged between 2 and 36 years old in Morocco (Fez city). We conducted a prospective-descriptive study including patients with ID of 61 females and 125 males from three different ID centers in Fez city. Our study carried between out October 2014 and July 2019. We used IBMSPSS version 24 to assess and analyze the data. Our data revealed a high frequency of male ID (67.2% in males versus 32.8% in females). The male to female ratio was 2.04. The mean age of our patients was 15.52 ± 6.59 years (2-36 years). The prevalence of epilepsy in ID patients was 21.72%. The rate of epilepsy in males (21.9%) is higher than in females (17.7%). Genetic factors play a major role of occurrence in ID in our series. Approximately (13.97%) of epileptic patients have ID due to genetic factors. Approximately a quarter of our patients took antiepileptic and/or neuroleptics to prevent the occurrence of seizures. No association has been found between gender and epilepsy in ID.

Keywords: Epilepsy, Intellectual Disability, Gender, Morocco.

Introduction

Epilepsy is currently known as "seizure disorders" and is the condition of recurrent, unprovoked seizures (Stafstrom & Carmant, 2015). It is the most common neurological disorder related to brain injury that can be diagnosed by electroencephalogram (EEG) (Memisevic & Sinanovic, 2009). Although the occurrence of seizures affects the body function, movement, sensation, awareness or behavior, epilepsy has numerous causes, each reflecting underlying brain dysfunction (Chang *et al.*, 2020). Its prevalence of epilepsy is 0.5–1% in the population of the western countries (Mefford, 2014). There are several forms of epilepsy depending on the age of its onset of epilepsy, seizure type and etiology; we distinguish several forms of epilepsy (Berg & Scheffer, 2011). However, three major classes are documented: Focal epilepsy, epileptic encephalopathy and genetic generalized epilepsy. Its etiology is diverse due to different factors causing epilepsy; genetic causes and non-genetic causes (acquired etiologies) (Mefford, 2014).

Intellectual disability (ID) is characterized by a significant impairment in intellectual function, associated with impairment in adaptive behavior: communication, domestic personal care, social skills, use of community resources, autonomy, health and safety, school, leisure, as well as work (Memisevic & Sinanovic, 2009). It can appear in early childhood before 18 years of age. Epilepsy is associated with ID and other developmental disorders (d'Orsi *et al.*, 2017) and it is the most common clinical feature in ID patients. It is reported that the prevalence of epilepsy is increased (16-

CONTACT Y. Benmakhlouf ✉ yousra.bmk@gmail.com ✉ Biomedical Genomics and Oncogenetics Research Laboratory, Faculty of Sciences and Techniques, University Abdelmalek Essaadi, Tangier, Morocco

50%) in patients with ID compared to those without ID (McGrother *et al.*, 2006; van Blarikom *et al.*, 2006; Li *et al.*, 2020).

To the best of our knowledge, there are no studies conducted in Morocco about the occurrence of epilepsy in ID patients related to gender and etiology of ID. Generally, studies in ID are very scare in the North Africa and particularly in Morocco. Our study is the first to assess the occurrence of epilepsy in ID patients in relation to sex and etiology of ID in Moroccan Patients.

Patients and methods

Patients

The present study included 186 Moroccan patients (125 males and 61 females) with mild ID (Intellectual Quotient (IQ) is inferior than 70) and Non-Syndromic ID (NS-ID) from three different centers for the mentally retarded in Fez: "Attawassol center for mentally retarded", "Mafatih Arrahma" and "Prince Moulay Abdellah foundation" between October 2014 and July 2019. Patients aged between 2 and 36 years old. All patients were classified into three etiological categories according to the etiology of the occurrence of ID: genetic factors (heredity, consanguinity….), environmental causes (prematurity, trauma, infections…) and unknown causes of ID.

All tutors of patients were asked to provide detailed information regarding personal and family history of ID by interview (Patient's characteristics and clinical manifestations) and signed an informed written consent. The study was approved by the University Hospital Ethics Committee in the Faculty of Medicine and Pharmacy in Fez, Morocco.

Exclusion criteria: we have excluded patients with syndromic ID, trisomy or autism.

Statistical analysis

Descriptive statistics were performed with IBMSPSS version 24 Statistical Package for the Social Sciences software. The results were expressed as percentages. A two-sided P value < 0.05 was considered statistically significant. We calculated the odds ratio (OR) and the chi sqiare (X^2).

Results

Demographic details

About 186 ID Moroccan patients enrolled in the study of different centers and living in Fez city: 67.2% (n=125) were males and 32.8% (n=61) were females. The male to female ratio was 2.04. The mean age of our patients was 15.52 ± 6.59 years. They have a young age structure. The majority of our patients were at early childhood at the onset of ID symptoms. The mean age at which symptoms were presented was 3.04 ± 2.409. Our series shared generally similar socioeconomic conditions and lifestyle. The occurrence of epilepsy was observed in patients belonged to the 2-22 age groups (15.95%).

All patients were diagnosed with mild ID (IQ<70) and NS-ID. Demographic details are summarized in table 1.

Table.1. Demographic details for Moroccan ID patients with epilepsy.

	With epilepsy		**Without epilepsy**		**Total**	
	N	%	N	%	N	%
Age (years)						
2-12	20	7.63	51	19.46	71	
13-22	18	8.32	68	31.44	86	100
23-36	6	0.93	23	3.58	29	
Mean age (years)			15.52 ± 6.59			
Mean age at onset of symptoms (years)			3.04 ± 2.409			
Level of ID			Mild ID			

N= Number, %= Frequency.

Epilepsy occurence

The present study included 186 ID patients diagnosed only with mild and NS-ID using the Wechsler standardized to evaluate the IQ for each patient. We have excluded patients with syndromic ID (S-D), autism or trisomy. The occurrence of epilepsy in our series was 21.72%, and 15.45% (N=23) in males versus 6.88% (N=21) in females (table.2). Epilepsy is most frequent in males than females. Thus, correlation between epilepsy and sex is not statistically significant (X^2 > 0.005). The odds ratio (OR= 1.374: 0.59), so males with ID are 1.37 times more likely to have seizures then females with ID.

Etiology of intellectual disability

The occurrence of epilepsy according to the etiology of ID is shown in Table 3. There is no statistically significant difference in the occurrence of epilepsy between etiological categories (X^2 = 0.442).

Table 2. Occurrence of epilepsy according to gender.

Sex	With epilepsy		Without epilepsy		Total	
	N	%	N	%	N	%
Males	23	15.11	102	67.13	125	
Females	21	6.66	40	11.10	61	100
Total	44	21.77	142	78.23	186	

Table.3. Occurrence of epilepsy in relation to etiology of Intellectual Disability (ID).

Etiology	With epilepsy		Without epilepsy		Total	
	N	%	N	%	N	%
Genetic	26	13.97	81	43.54	107	57.52
Environmental	14	7.52	42	22.58	56	30.1
Unknown	5	2.68	18	9.67	23	12.36
Total	45	24.17	141	75.8	186	100

Medication treatment

Antiepileptic drugs (AEDs) are the main type of treatment prescribed for patients with epilepsy to alleviate epileptic seizures. In our series, just 25% of our patients took regularly their AEDs. In general, the treatments of ID were symptomatic and not curative.

Discussion

Epilepsy affects individuals with ID and remains major public health problem especially in developing countries where access to new therapies is limited (Bahbiti *et al.*, 2013). However, ID affects 1 to 3% of the general population (Hege, 2019), and epilepsy is present in 0.7 to 1% of the general population (Holden *et al.*, 2005). The prevalence of epilepsy in people with ID is apparently higher than in the general population (Matson *et al.*, 2004; McGrother *et al.*, 2006). In Morocco, disorders like epilepsy and ID do not reach importance so far. To enrich the literature and the knowledge of epilepsy and ID in our country, the objective of our work aimed to determine the occurrence of epilepsy in Moroccan ID patients in relation to gender, and in relation to etiology of ID and to determine epileptic medication. Our research included 186 Moroccan patients with mild ID (IQ<70) and NS-ID enrolled at three centers for mentally retarded in Fez city: “Attawassol center for mentally retarded”, “Mafatih Arrahma” and “Prince Moulay Abdellah Foundation”.

Our series of ID were characterized demographically by a male predominance (67.2 % of males versus 32.8% of females). This was in accordance with literature data (Raymond, 2005); Rogers *et al.*, 2008). All patients were diagnosed with mild and and NS-ID. The mean age was 15, 52 ± 6, 59. The sex ratio male to female was 2.04. All patients were diagnosed with ID at the early childhood. The mean age at the onset of symptoms

was 3.04 ± 2.409. Unfortunately, the majority of our patients did not have a complete diagnosis because they did not have a medical coverage, treatment and rehabilitation.

In our series, 21.72% of patients suffered from epilepsy. Our result was in accordance with previous studies (Leonard & Wen, 2002; van Blarikom *et al.*, 2006; Memisevic & Sinanovic, 2009). The rate of epilepsy in males (15.11%) is higher than in females (6.66%), which is comparable to other studies (Yousef, 1995; Forsgren *et al.*, 2005; Memisevic & Sinanovic, 2009). However, this discordance is not statistically significant. Moreover, there is a relationship between ID and epilepsy. It is reported that epilepsy increase with level and severity of ID (Morgan *et al.*, 2003). Gender does not affect epilepsy.

There is heterogeneity of ID factors. Approximately 13.97% (N=26) of patients with ID had epilepsy due to genetic factors. Regarding the other etiologies of ID, the occurrence of epilepsy was found in 7.52% (N=14) of ID patients had epilepsy due to environmental factors (prematurity, trauma, infections…), followed by unexplained factors in 2.68% (N=5) of ID. Thus, we have been unable to find any association between etiological ID and occurrence of epilepsy.

Several drugs are used to treat epilepsy and all decrease the electrical activity of the brain (Stafstrom & Carmant, 2015). The three major methods to treat epilepsy are surgical treatment, behavioral treatment, and the use of AEDs. According to previous studies, AEDs are the most common and most effective method of treatment (Mattson, 1996; Matson *et al.*, 2004). A quarter of our ID patients took antiepileptic drugs to prevent the occurrence of crises. The efficacy of these medications depends on etiology of ID. Generally, a wide-spectrum medication is prescribed for each patient.

Conclusion

As far as we know, studies about epilepsy and ID in Moroccan population are very scarce, and this is the first study to assess the prevalence of epilepsy in Moroccan ID patients, and to evaluate the relation between epilepsy in ID and gender. Our results showed no association between gender and epilepsy in ID among the Moroccan population.

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Ethical Approval

This study was approved by the Ethical Committee protocols of University Hospital Ethics Committee in the Faculty of Medicine and Pharmacy in Fez, Morocco (CEHUF).

Competing interests

The authors have declared no conflict of interest.

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