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Clinical and epidemiological characteristics of functional neurological disorders in children and adolescents treated in the child psychiatry department of Casablanca

Abstract

Objectives: Functional neurological disorders (FNDs) are a common source of disability in medicine. Patients have often been misdiagnosed, correctly diagnosed after long delays, and/or subjected to misdiagnoses that lead to inadequate treatments, unnecessary costly evaluations, and poor outcomes.

We sought to identify the epidemiological and clinical characteristics of children and adolescents suffering from functional neurological disorders in the child and adolescent psychiatry department in CASABLANCA.

Methods: We conducted a retrospective study of 52 children and adolescents admitted for functional neurological disorders from March 2019 to July 2021, and analyzed their clinical profiles, sociocultural, environmental and psychological characteristics.

Results: In our study, nearly the threatening quarters of the patients were girls, stressor antecedents were notably reported, most often related to family stressors. Recent or distant history of abuse was of varying degrees. The neurological presentations were complex, with nearly half of the patients having multiple distinct neurological symptoms. Motor symptoms and non-epileptic seizures were the most frequent, with an acute mode of onset in the majority of the cases. The course was marked by the regression of symptoms in the majority of patients, with their persistence in the third of the cases, meanwhile a small group of the cases interrupted the follow-up.

A high resource use was noted due to the participation of several specialized consultants, the conduction of many diagnostic studies, and lengthy hospital stays.

Conclusion: Our data confirms previous findings in the literature and contributes to a better understanding and characterization of our population.

Keywords: children, adolescents, psychiatry, socio-cultural factors, environmental factors, functional neurological disorders (conversion), clinical manifestations.

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Abbreviations: FND, functional neurological disorder; CT, cerebral computed tomography; MRI, magnetic resonance imaging; EEG, electroencephalogram; TAP, thoracic-abdominal tomography; SD, standard deviation; NS, non-significant.

Introduction

Functional neurological disorder (FND) also known as conversion disorder, as defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5),[1] involve an impairment of voluntary motor and sensory functions that are inconsistent with a recognized neurological or medical condition, and cannot be explained by any other medical or mental health disorder.

Specific symptoms include paralysis, muscle weakness, paresthesia, altered consciousness, tremors and seizures.

In childhood, FND most commonly occurs between the ages of 12 and 16, and are rarely seen before the age of 7.[1,2]

In the literature, females are significantly more likely to be diagnosed with FND compared to males, although several studies have noted that this predominance disappears at earlier ages, as is the case with other mental disorders in children.[3]

Motor symptoms, such as weakness, abnormal movements, and non-epileptic seizures are the most common manifestations among children and up to half of the patients display several distinct symptoms.[4]

Psychosocial stressors and psychological conflicts have long been considered to play out a role in the development of many conversion symptoms. In adults with FND symptoms, early sexual assault or physical abuse are quite common.

At the same time, other prior stressors have been identified in the vast majority of children and adolescents, the most common being family conflicts, separation from a family member, and school bullying.[5] In some patients, early symptoms may precede an illness or a medical intervention.

According to the DSM-5, the diagnosis of FND no longer requires the identification of precipitating stressors, as these are not always present, although recent and historical stressors are more common in patients with FND than in healthy participants and clinical controls.[6]

In theory, the development of FND could be due to unresolved psychological conflicts that have been converted into physical or psychiatric symptoms, which have been socially accepted and protect

the child from conflicts or painful memories.[6] The disease also brings relief from unpleasant and difficult to accept sensations (primary benefits), reduces high expectations and increases the attention of relatives (secondary benefits).[7]

Previous studies have shown that children with conversion disorder often show multiple somatic symptoms and comorbid psychiatric disorders.[8,9] Moreover, cognitive deficits may occur in some patients with conversion disorder.[8] Therefore, it is important to understand the clinical, sociocultural, environmental, personality and psychiatric/psychological characteristics of children with dissociative (conversion) disorders in order to establish early diagnosis, treatment and long-term prognosis.

Methods

This is a retrospective descriptive study based on the examination of medical records, reported on individual exploitation forms for evaluation and analysis of the socio-epidemiological and clinical profile of patients who were admitted to the child and adolescent psychiatry department, at Children's Hospital ABDERRAHIM HAROUCHI, HASSAN II University, Casablanca, between March 2019 and July 2021 with a primary diagnosis of functional neurological disorder.

Fifty-two patients with a FND who met the inclusion and exclusion criteria were identified in this period.

Inclusion criteria were a diagnosis of a functional neurological disorder according to DSM-5 criteria,[1] an age between 9 to 18 years, and language proficiency.

Exclusion criteria were the presence of a physical/somatic illness, psychotic disorder, neurodevelopmental disorder, or substance abuse/dependence.

During the follow-up of these patients, clinicians performed a thorough examination to exclude physical or somatic diseases. Additional diagnostic procedures were conducted if necessary, such as cerebral computed tomography (CT), scans, magnetic resonance imaging (MRI), electroencephalograms, electromyograms, echocardiograms, electrocardiograms, pulmonary function tests, and other explorations.

Later on, clinical child and adolescent psychiatrists conducted comprehensive interviews and assessments of each patient. When these patients were diagnosed with functional neurological disorders, they were all treated with a combination of individual psychotherapy, pharmacotherapy and family therapy.

When we determined the patients to be included in the study, we created a detailed clinical data questionnaire for each patient; existing epidemiological data on patients and family members, including gender, age of onset and consultation, socioeconomic and educational level, as well as precipitating factors (stressors), major clinical signs and symptoms, family history, sociocultural factors, and ancillary test results, which were obtained from medical records.

Results

Demographics: A total of 52 children and adolescents were enrolled in the study; their demographic and environmental data are summarized in Table 1. Of the 66 patients, 37 (71.2%) were girls and 15 (28.8%) were boys, and their mean age at disease onset was 12.3 years (SD = 1.7, range = 9-18 years). Overall, 35 (67.3%) of the patients were between the ages of 10 to 14, and 17 (32.6%) were between the ages of 14 to 18 years.

All of these patients were attending school, and the socio-economic level of most of the families ranged from medium to low as shown in Table 1.

Table 1 Demographic and environmental data of patients with functional neurological disorders

Features	Total (N=52)
Age (years), mean, (SD), range	13.5, (2.1), 9-18
Gender, n (%)	
Male	15 (28.8)
Female	37 (71.2)
Grade level, n (%)	
Primary	18 (34.6)
Secondary	17 (32.7)
High School	16 (30.8)
Academic performance, n (%)	
Good	23 (44.2)
Medium	18 (34.6)
Low	11 (21.2)
Socioeconomic level, n (%)	
Low (< 2000 MAD)	26 (50)
Medium (4000-6000 MAD)	15 (29)
Good (> 6000 MAD)	11 (21.2)
Marital status of parents, n (%)	
Married	42 (81)
Divorced	8 (15.4)
Single mother	2 (3)
Number of siblings, n (%)	
0	9 (17.3)
2-Jan	18 (34.6)
4-Mar	19 (36.5)
≥ 5	6 (11.5)
Age of onset of 1er symptom (years), (SD)	12.3 (1.7)
Age at 1ere visit (years), (SD)	12.6 (1.7)
Family history: Similar case in family, n (%)	
Positive	9 (17.3)
Negative	43 (82.7)
Neurological family history, n (%)	
Positive	11 (21.2)
Negative	41 (79)
Psychiatric family history, n (%)	
Positive	21 (40.4)
Negative	31 (59.6)
Parental involvement, n (%)	
Cooperative	41 (79)
Uncooperative	11 (21.2)

Clinical assessment of patients: Proper evaluation of functional neurological disorder (FND) requires a detailed history and a complete neurological examination, as well as biological and neuroimaging Para clinical tests.

The initial evaluation of suspected TNF in these 52 patients began with a detailed questioning of physical symptoms, thus assessing the mode of onset of the clinical picture; 28 (53.8%) patients presented with an acute onset, 17 (33%) patients with a subacute onset while only 7 (13.5%) patients had a progressive mode of onset.

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The clinical investigation was followed by a complete neurological examination, in collaboration with the neuropediatric department. Numerous tests were used to distinguish whether the symptoms were of functional origin or due to an organic cause. For example, the Hoover sign is the most commonly used test to assess functional weakness of the lower limbs.[10]

Similarly, the Abductor sign is another way to assess functional weakness of the lower limbs. It is positive when the abduction of the "weak" hip becomes normal while the "weak" hip is removed.[11]

The evaluation is not completed without additional biological and neuroimaging tests, because positive signs on a functional test do not exclude underlying neurological or medical conditions. Thus, routine biological tests (complete blood count, chemistry, liver function test, thyroid function test, erythrocyte sedimentation rate, C-reactive protein, etc.) and neuroimaging tests, including cerebral computed tomography(CT), spine and brain MRI, were performed at each patient's first visit.

An electroencephalogram (EEG) and video EEG were realized to distinguish true epileptic seizures from those that are psychogenic.

Other Para clinical examinations were requested according to the clinical presentation, such as electroneuromyography, electrocardiograms, thoracic radiology, thoracic-abdominal tomography (TAP), ophthalmological consultation, etc. The results of these additional tests and imaging studies came back normal in our patient's series.

However, it should be kept in mind that imaging and biological findings of some chronic neurological diseases such as autoimmune-related neurological diseases may also be normal; therefore, neurological follow-up was recommended, to continue monitoring the symptoms that were not suggestive of chronic neurological diseases at the initial visit.

After eliminating an organic origin, a complete child psychiatric evaluation was done to better explore the psychiatric semiology of these patients, highlighting the antecedent and current stress factors, the events triggering this symptomatology as well as psychiatric comorbidities.

In our study, 27 patients (52%) presented a thymic lability, 40 patients (76,9%) had behavioral disorders such as irritability, impulsivity and aggressiveness, while 20 patients (38,4%) suffered from sleeping disorders.

History and stressors: Most of the patients had a positive family history, of which 40.4% had a family history of psychiatric disorders, depression and obsessive-compulsive disorder were most notable, and 17.3% had similar cases in the family, while 20% had a family history of neurological disorders.

More than two-thirds of the patients (76.9%) had antecedent stressors, the most common being family conflicts or parental divorce (42.5%), school bullying (25%), bereavement of a loved one (17.5%), moving (15.5%), and physical abuse and/or sexual assault (11.5%) (Table 2).

Clinical manifestations: Table 3 shows the different clinical manifestations of the 52 children and adolescents with functional neurological disorders. Loss of consciousness (50%) was the most frequent manifestation, 20 (38.5%) patients had motor neurological symptoms (paraplegia, hemiparesis, etc.), 15 (28.8%) had seizures that could be classified as psychogenic non epileptic seizures, 12 (23.07%) had sensory symptoms (including anesthesia, hyperesthesia, or visual or auditory disturbance), and 11 (21.5%) had paroxysmal abnormal movements, the most frequent being tremor of the extremities with motor tics.

Table 2 Stressors reported in this study (N=52)

Stressors	N (%)
Conflict environments (parental conflict, punishments...)	22 (42.5)
School harassment	13 (25)
Bereavement of a loved one	9 (17.5)
Moving	8 (15.5)
History of physical assault	6 (11.5)
History of sexual abuse	4 (8)
Other (change of school, arrest of a family member...)	4 (8)

Table 3 Clinical manifestations of children and adolescents with functional neurological disorders (N =52)

Clinical manifestations	N (%)
Motor signs	20 (38.5)
12 (23.1)	
Paraparesis	6 (11.5)
Hemiparesis / Hemiplegia	4 (7.6)
Abnormal movement	9 (17.3)
Loss of consciousness	26 (50)
Sensory disorders	11 (21.2)
Convulsive seizures	15 (29)
Cognitive disorders	
Memory disorder/	25 (48)
Attentional/concentration disorder	15 (29)
Learning disorders	17 (32)
Language impairment	10 (19)
Visual impairment	5 (10)
Other neurological signs (headache, chronic myalgia...)	8 (16)

Other somatic symptoms were present in 20% of the patients, such as headaches, musculoskeletal pain, chronic myalgia and gastrointestinal disorders being the most frequent, in that order. Cognitive disorders were notably present in 48% of the cases, often manifesting as attentional and concentration disorders, which most often affected the schooling quality.

No significant correlation between the neurological presentations and sex and/or age was found.

Evolution: The management of functional neurological disorders is a multidisciplinary process that begins with the diagnosis announcement, for the patient and his family, with clear and intelligible words, in order to establish a good therapeutic alliance with the care team.

This increases the likelihood of the adherence and success of the therapeutic strategies. Although evidence from randomized clinical trials is limited, in our study, 30 patients had a good outcome following comprehensive management, based on individual and family psychotherapy and treatment of comorbidities; while in 15 other patients, the symptoms persisted.

A bivariate statistical analysis was performed to test the eventual relationship between the degree of progression and the different studied factors. The independent variables included demographic

variables (age of onset, gender, family history and precipitating factor), environmental variables (monthly family income, parental involvement, level of education...) using the statistical test of X_2.

The results were coded as 0 and 1, where 1 represents the "good evolution" group and 0 the "persistence" group of the clinical picture and it turned out that the test X_2 (Table 4), does not confirm any relationship. This is mainly due to the limited size of our sample n=52 (p value > 0.05), therefore, future multicenter studies with larger samples will be needed to support this course.

Table 4 Bivariate study of the different factors and the degree of clinical evolution (good and persistent)

Factors	Evolution		P value
	Good (n=30)	Persistence (n=15)	
Gender			
Female	21 (70%)	11 (73 %)	1
Male	9 (30%)	4 (27 %)	NS
Age (years)	13.7 (2)	13.5 (2)	0.714
Age of onset of	12,6 (1.5)	12,3 (1.5)	0.533
first symptoms			NS
Socio-economic status	16 (53 %)	8 (53%)	
Low	14 (47 %)	7 (46%)	0.813
Average - Good			NS

Discussion

Although the prevalence of functional neurological disorders in children and adolescents has been shown to be low compared to adults[5] and in the absence of solid data on the prevalence of this disorder in the Moroccan pediatric population, in our study, FND was a fairly common reason for consultation in children and adolescents.

The predominance of adolescents and the female gender found in other studies was replicated here. Several explanations have been suggested for this female predominance, including likelihood of help-seeking, culturally acceptable modes of distress expression, higher rates of sexual abuse and physical assault, and high rates of comorbid depression that are predominantly female.

Motor symptoms and non-epileptic seizures are the most common symptoms in children with conversive disorders, which is also consistent with the results of our study.

Almost half of the patients had more than one neurological symptom. This is another feature that distinguishes children with FND from adults with FND, who typically have only one symptom.[12,13]

However, we found that many patients had other somatic symptoms (such as sensory disturbances, headaches, myalgias, etc.), hence the need for further exploration, as they can be as disabling as the neurological symptoms.

Our research found that approximately two-thirds of patients had prior stressors, and the most common stressors were similar to those reported in previous studies, primarily family and school factors.[2]

Children are particularly sensitive to the above-mentioned triggers because of their immature personalities, heightened sensitivity to adverse situations, and their psychosomatic reactions.[14]

Kozlowska et al.[4] pointed out that family disruptions can be very threatening to the child's perceived safety and can be similar to certain trauma for adults. Furthermore, it seems that patients with a history of trauma are those who are at risk of persisting the disorder into adulthood.

Multidisciplinary treatment is considered the most effective treatment for functional neurological disorders. The treatment is based on a comprehensive psychotherapeutic approach that includes cognitive-behavioral therapy and psychodynamic therapy. Other approaches, such as family therapy and medication in case of concurrent disorders, insure better results.[8] The first therapeutic approach is to stabilize the child's emotions by establishing a therapeutic alliance based on trust and hope, using specific therapeutic relaxation techniques and ensuring that the child can identify and express his or her emotions and needs. For patients with prior trauma, family therapy can improve family communication by correcting patterns of interaction that promote conversion, and help parents manage guilt or denial related to the prior trauma. Family work to promote attachment experiences is also important.[13]

Most children make a full recovery within a few weeks of therapeutic interventions. However, in rare cases, symptoms can last much longer, sometimes several months or even years.[15] This is consistent with our study, 30 patients (60%) showed a good evolution after comprehensive management based on individual and family psychotherapy with medication treatment of comorbidities; while in 15 (28.8%) patients the symptoms persisted this can be explained by the fact that they were lost from sight for several months without treatment or follow-up; the resumption of contact was made after relapse or worsening of the clinical picture. We also noted that almost all the patients' relatives had some initial reticence about the diagnosis, and a lack of understanding, acceptance, or both, which leads to poor cooperation with the therapeutic process and delays recovery.

In this case, it is important to effectively address the parents' questions and potentially negative reactions, explain that the child's symptoms are not factitious or intentionally induced, and encourage the parents to cooperate with the treatment plan.[14]

Limitations

Although our study benefits from data from extensive formal psychiatric and neurological assessments, it is limited by the lack of a control group, and the limited number of patients, as well as the lack of a prospective semi-structured interview to ensure internal consistency in the patient's evaluation.

In addition, larger sample sizes in the future will make it easier to find subgroups, which will give more power to data analysis.

Conclusion

Functional neurological disorders are frequent and disabling, but potentially reversible.

This study describes the clinical characteristics, sociocultural and environmental factors of children with functional neurological disorders in the child and psychiatry department of Casablanca.

A better understanding of the psychiatric and psychological aspects of these patients may contribute to a correct diagnosis that can prevent unnecessary diagnostic tests and a faster transition to appropriate treatment. Therapeutic success is based on the establishment of a diagnosis that validates the patient's symptoms and disability and allows for a full understanding and acceptance of the disorder by the patient.

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Conflicts of interest

There is no conflict of interest regarding the publication of this article.

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