

Specific learning disorders and psychiatric comorbidities in school children in Sfax, Tunisia

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Abstract

Objectives: The problem of specific learning disorders is more complex in the presence of comorbid psychiatric disorders. This study was conducted to determine the comorbidity of psychiatric disorders and specific learning disorders and the factors associated with this comorbidity.

Materials and methods: The present study was cross-sectional, descriptive, comparative and analytical, involving 49 students with specific learning disorders. These students benefited from a semi-structured child psychiatric interview based on the criteria of the DSM-VI-TR. Similarly, individual, family and perinatal data were collected. Two groups of children were identified so: a first group of 24 children with specific learning disorders without psychiatric comorbidity and a second group of 25 students with specific learning disorders with psychiatric comorbidity. The analytical study was to compare the two groups, with a univariate analysis, search for possible correlations between the variable group and different variables.

Results: Psychiatric comorbidity was found in 51.02% of cases. These were anxiety disorders in 38.85% of cases, elimination disorders in 30.61% of cases, language disorders in 28.57% of cases, attention deficit hyperactivity disorder in 18.36% of cases, major depressive episode in 8.1% of cases, oppositional defiant disorder in 6.1% of cases, and tic disorder in 4.08% of cases. The psychiatric comorbidity was not correlated with any of the factors studied.

Conclusions: The results of this study involve systematic search for psychiatric disorders in children with specific learning disorders. Likewise, child psychiatrist should consider exploring the trail of specific learning disorders in any child with psychopathology. These children should receive global care considering this comorbidity.

Introduction

Specific learning disorders in children (SLD), according to the name of the Diagnostic and Statistical Manual of Mental Disorders, fifth edition, (DSM-V) [1], or also called dyslexia, dysorthography, dyscalculia, are new clinical and therapeutic issues facing physicians since the prevalence of these disorders in the world as well as in Tunisia is of the order of 2 to 10% among school-aged children [2,3]. However, reading, writing and arithmetic are today not only the bases of school learning but also essential tools in the people's daily life, where written language is of paramount importance. Actually, the problem of SLD becomes more complex in the presence of co-morbid psycho-pathological disorders. In fact, this comorbidity is described in 50% of children with SLD [4-6]. Moreover, in the current practice, we are confronted mainly with SLD accompanied by psycho-affective or behavioral disorders. In front of this comorbidity, several psychopathological or psychological, somatic and psycho-social problems can be interconnected where SLD is only one of its elements. The objective of this work is therefore to study the co-morbid psychiatric disorders in children with SLD and investigate the factors associated with this comorbidity.

Material and method

Type of study

The present study is cross-sectional, descriptive, comparative and analytic involving a sample of 49 school-aged SLD students with an average age of 10.43±0.76 years and a sex ratio of 1.33. This is a study conducted as part of a 4-year federated health research program launched by the Ministry of Higher Education and Scientific Research

and Technology in 2005 entitled "Taking into account the charges of specific learning disorders and differential diagnosis of mentally handicapped (school failure)". This project covers three Tunisian governorates (Tunis, Monastir and Sfax). In the governorate of Sfax, for example, this study was coordinated by the child psychiatry and pediatric neurology teams at Hédi Chaker University Hospital Center. In fact, this research study covers part of this project and focuses on the study of the psychiatric comorbidity of children with SLD. On the other hand, the epidemiological part of the SLD was treated in another article showing a prevalence of SLD in the order of 10.3% [3] in Sfax region.

Subjects and procedure

The school physicians and teachers rated students on screening proformas developed by the conceptors of the research program. The marks obtained by students in the actual class were taken from the school records. Inclusion criteria for assessment of dyslexia were (1) two affirmative responses on screening proforma given by teachers; (2) intelligence quotient (IQ) >80; (3) students enrolled in school for at least six months; and (4) students whose parents consented for participation

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Key words: specific learning disorders, comorbidity, psychiatric

Received: September 21, 2018; **Accepted:** October 11, 2018; **Published:** October 15, 2018

in study. Exclusion criteria were (1) borderline intelligence and mental retardation, (2) epilepsy, (3) neurological problems, (4) chronic disease and (5) severe sensory impairment (auditory and visual).

Of the 687 students, 304 students scored 2 or more on teacher screening proforma. These 304 students were identified as having academic difficulties. School doctors and school principals summoned these students to the pediatric neurology and child psychiatry departments of Sfax. The two teams go to schools to examine children who did not respond to the convocation. All parents have signed a consent form allowing their child to join the survey. Of the 304 students having academic difficulties, 209 students underwent a child psychiatric interview, a pediatric neurological examination, an intelligence test and a language evaluation by a speech pathologist. The other participants were lost from assessments. Meetings between the two research teams in pediatric neurology and child psychiatry were held to discuss cases of diagnostic doubt. The summary of the results concluded that there were no academic difficulties in 107 students, all of whom had a normal neurological examination, IQ, and speech pathology assessment. The diagnosis of school difficulties was retained in 102 remaining children. Among these 102 students with academic difficulties, the diagnosis of SLD was mentioned in 49 students who had normalized IQ, normal neurological examination, and disorders observed during the language evaluation conducted by speech pathologist.

These 49 children with SLD benefited from an intellectual assessment and a neurological examination. These children were examined by a child psychiatrist, in the presence of at least one of their parents. In fact, the semi-structured child psychiatric interview referring to the diagnostic criteria of the DSM IV TR [7] helped us identify mainly the co-morbid psychiatric disorders.

Individual, family and other data related to pregnancy and delivery were collected using a pre-established form. Therefore, we were able to identify two groups: a first group of 24 SLD children without psychiatric comorbidity and a second group of 25 SLD children with psychiatric comorbidity.

Approval of District Education Officer was taken, and then school principals were contacted. Written informed consent from parents of students was obtained.

Instruments

Socio-demographic proforma: Socio-demographic sheet to obtain information regarding age, gender, *etc.* was prepared.

Screening proforma: A screening proforma were prepared for the class teacher. Since the class teacher spends considerable time with students, his/her perception about student's performance could be taken as the first index to screen the students in the school. Hence teachers' perception was taken on unexplainable absence from school, below average academic performance, poor writing ability, problem in reading ability and poor mathematical competence.

Semi structured child psychiatric interview: Psychiatric evaluation consisted in a semi-structured interview referring to DSM IV by 8 trained child psychiatrists.

Intelligence test: The evaluation of the IQ was done thanks to three items of the Arabized and standardized EDEI-A in Tunisia [8]. The test was administered by 3 trained psychologists.

Speech pathologist assessment: Two trained speech pathologists participating in the study evaluated language comprehension and use

(phonology, morphology, syntax, semantics, pragmatics), phonological processing, including phonemic awareness, articulation (speech sound production), letter/sound knowledge, word-finding difficulties, narrative discourse, short-term memory, reading and writing.

Statistics

The data entry was conducted using the SPSS Epidemiology and Statistics software and Excel. The descriptive study enabled us to record frequencies for the qualitative variables and the averages for the quantitative ones. The analytical study consists in comparing both groups of our sample using a univariate analysis to look for possible correlations between the group variable and the other variables. The Chi 2 Test (χ^2) was used to compare the frequencies and Fisher's exact test when the Chi 2 Test (χ^2) is not possible. The difference is considered significant if $0.01 < p < 0.05$, very significant if $0.001 < p < 0.01$ and highly significant if $p < 0.001$.

Results

Prevalence of co-morbid psychiatric disorders

A psychiatric comorbidity was found in 51.02% of SLD children

Distribution based on the type of the co-morbid psychiatric disorder (Figure 1)

Prevalence of psychiatric comorbidity based on individual factors (Table 1)

Prevalence of psychiatric comorbidity on the basis of family factors (Table 2)

Prevalence of psychiatric comorbidity based on factors related to pregnancy and child birth (Table 3)

Discussion

Prevalence of psychiatric comorbidity

In this study, a co-morbid psychiatric disorder was observed in 51.02% of the students with SLD. Previous studies have shown figures ranging from 24% to 54%. This prevalence is four times more common in SLD children than in their non-SLD peers [9].

These studies suggested that a SLD often predisposes children to a subsequent psychiatric disorder even if it did not exist in the first assessment. Therefore, emotional and / or behavioral disorders may mask the learning difficulties. This emphasizes that the clinician should be vigilant in the assessment and management of the SLD. In fact, some authors link this comorbidity to common genetic causes between a SLD and a psychiatric disorder [10] while others see that the relationship between the SLD and psychiatric disorders can only be linear and causal. Moreover, other authors [11] see that psycho-affective dimensions are important in the learning to read and that the desire to learn requires affective tranquility, harmonious quality of development, as well as some psychosocial variables even though these ones are sometimes delicate to be interpreted in terms of their possible influence on the learning to read.

Types of co-morbid psychiatric disorders

Anxiety disorder: An anxiety disorder was identified in 38.85% of the children in this study (Figure 1), which is in line with the results existing in the literature [12-15]. To explain the frequency of co-morbid anxiety disorders in reading disorders, Carroll *et al.* [13] suggest that school-related environmental factors seem to be preferred. Faced with

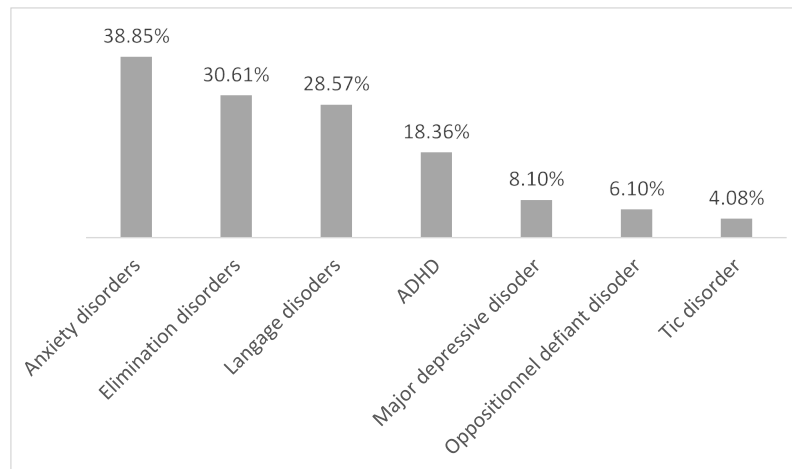


Figure 1. Distribution per type of comorbid psychiatric disorder (Total of 49 students) [*Possibility of combining two or more psychiatric disorders; ADHD: Attention deficit hyperactivity disorder]

Table 1. Rates of psychiatric co-morbidity according to individual factors

Variables		SLD without co-morbidity	SLD with co-morbidity	<i>p</i>
Sex	Male	66,7%	50%	0,212
	Female	33,3%	50%	
Medical-surgical history	Yes	26,1%	29%	0,811
	No	73,9%	71%	
Language development	Normal	95,7%	90%	0,440
	Delated	4,3%	10%	
Repeating a school year	Yes	41,7%	54,8%	0,333
	No	58,3%	45,2%	
Intelligence quotient (IQ)	<90	20%	29,6%	0,454
	>90	80%	70,4%	
Minor neurological signs	Yes	90,9%	77,8%	0,413
	No	9,1%	22,2%	

Table 2. Rates of psychiatric co-morbidity based on family factors

Variables		SLD without co-morbidity	SLD with co-morbidity	<i>p</i>
Parents' consanguinity	Yes	39,1%	30%	0,487
	No	60,9%	70%	
Separeted parents	Yes	16,7%	18,8%	0,84
	No	83,3%	81,3%	
Socio-economic level	Good	12,5%	12,5%	0,137
	Medium	16,7%	40,6%	
	Weak	70,8%	46,9%	
Geographical origin	Urbain	37,5%	59,4%	0,105
	Rural	62,5%	40,6%	

Table 3. Rates of psychiatric co-morbidity based on factors related to pregnancy and child birth

Variables		SLD without co-morbidity	SLD with co-morbidity	<i>p</i>
Pregnancy history	Yes	12,5%	11,1%	0,878
	No	87,5%	88,9%	
Weight at birth	Normal	79,2%	96,4%	0,052
	Abnormal	20,8%	3,6%	
Neonatal suffering	Yes	12,5%	10,7%	0,841
	No	87,5%	89,3%	
Neonatal resuscitation	Yes	8,3%	7,1%	0,872
	No	91,7%	92,9%	

the experience of repeated and unexplained failures, the child will often develop a major performance anxiety, sometimes favored by adults. The diagnosis of the SLD will then have a restorative dimension by explaining the difficulties encountered and by providing the appropriate assistance [16].

Elimination disorders: In the present study, the frequency of elimination disorders, is like other studies [17], which is of the order of 30.61% (Figure 1), may be related to anxiety and depression in SLD children. Moreover, through elimination disorders, the child can acquire secondary benefits, such as increased attention, overprotection, infant regression..., which occur mainly in relation to the parental images with which the child often has conflicting relations.

Language disorders: The child psychiatry interview revealed that 28.57% of the SLD children had a language disorder (Figure 1). In fact, in most series of the literature [18], dyslexia in more than half of the cases is the result of oral language disorders. The link between reading disorders and oral language disorders may depend shared cognitive factors [18] and/or to the probable existence of common susceptibility genes [19] and/or psychopathological factors [20,21]. In all cases, if there is evidence of a developmental disorder of oral language, even if it is moderate, it is necessary to wake up the vigilance concerning the possible difficulties when approaching the learning to read in order to set up, as soon as possible, a speech therapy rehabilitation targeting the written language, whether parallel or not to the continuation of the reeducation of the oral language. As a consequence, oral language disorder must be detected or even taken care of in kindergarten [22].

Depressive disorder: In this study, depression is observed in 8.1% of SLD children (Figure 1). For their part, Goldston *et al.* [14] showed that 12.9% of children with reading disabilities have depression. Although the prevalence of depressive disorder remains limited, some authors showed an increased frequency of depressive symptoms and low self-esteem in children with dyslexia without a formal diagnosis of depression [23,24]. For this reason, this children's care must be comprehensive by considering these depressive symptoms.

Attention deficit hyperactivity disorder: Attention Deficit Hyperactivity Disorder (ADHD) was diagnosed in 18.36% of the children in our study (Figure 1). Previous estimates of the SLD and ADHD comorbidity vary widely between 9 and 80% [25-27], however, recent studies have estimated this comorbidity at 40% [10,17,28]. This low rate found in the present study, compared to the literature, could be explained by the fact that, on the one hand, instability, impulsiveness and inattention may not be revealed during a first interview [28] and, on the other hand, this disorder was not detected using the screening scale administered to parents and teachers.

Oppositional defiant disorder: In our study, an oppositional defiant disorder was observed in 6.1% of cases (Figure 1). Goldston *et al.* [14] showed that 10% of children with dyslexia have oppositional disorders. Opposition to the adult often begins in childhood with patterns of rebellion against adults and their rules. SLD children's parents may abandon or strongly support it due to these difficulties and thus, some forcing is inevitable. However, it may also be a diffuse anger, without a specific object, that the child experiences in front of his inability to control some of his cognitive functions [21].

Tic disorder: In this study, a tic disorder is observing in 4.01% of children (Figure 1). In fact, Huang *et al.* [29] noted that 1% of SLD children would have a comorbid tic disorder. Moreover, genetic causes are suggested for this association.

Analytical study

In this study, the SLD and psychiatric disorder comorbidity is correlated neither with individual factors (Table 1), nor with family factors (Table 2), or with factors related to pregnancy and childbirth (Table 3). The results of this analytical study also show the complex and multi-factorial character of SLD. This high comorbidity seems paradoxical with the specific character of SLD [30]. In this context, Goldston [14] states that this comorbidity is a reality that should not be ignored. Therefore, a causal relationship cannot be defined. The causes of the relationship between SLD and psychiatric disorders have been so far unknown.

Conclusion

This study shows the high comorbidity of SLD and psychiatric disorders. It may therefore be worthwhile to wonder about the nature of this symptomatic link, whether it is a comorbidity or a causal relationship, even if the distinction between these two hypotheses can, in clinical terms, seem difficult to identify. In fact, in any SLD case, the search for a psychiatric disorder is essential. The physician should consider exploring the SLD path in front of any child with a psychopathological disorder. Therefore, the challenge for the physician lies in his understanding of the complex clinical picture presented by these children. This understanding can be acquired only through an open approach that neglects neither the psychopathological factors nor the neuropsychological factors. In addition, the care system should offer simultaneous management of the learning disorder itself and its psychological effects by associating, for example, speech therapy and psychotherapy. The establishment of an adapted care, a specific rehabilitation and personalized educational facilities, will then enable the child to find his place in the educational system and recover mentally.

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