

Table 1. Comorbidities stratified by tic disorders

Comorbidity	Students with vs.without TD N=61 vs. 156 <i>P</i> value	Students with vs. without GR N=32 vs. 219 <i>P</i> value	Students with vs. without LD N=21 vs. 191 <i>P</i> value
Tics (%)	–	10 (31.3) vs. 51 (23.3) 0.13	13 (61.9) vs. 42 (22.0) 0.001
ADHD (%)	4 (6.6) vs. 5 (3.2) 0.43	3 (9.4) vs. 8 (3.7) 0.21	2 (9.5) vs. 10 (8.2) 0.02
OCD (%)	3 (4.9) vs. 8 (5.1) 0.53	3 (9.4) vs. 10 (4.6) 0.43	3 (14.2) vs. 10 (8.2) 0.10
PSD (%)	2 (3.2) vs. 0 (0) 0.04	0 (0) vs. 3 (1.4) 0.24	1 (4.7) vs. 1 (0.5) 0.11
Social phobia (%)	1 (1.6) vs. 5 (3.2) 0.84	1 (3.1) vs. 6 (2.7) 0.98	0 (0) vs. 7 (3.6) 0.53
Conduct disorder (%)	3 (4.9) vs. 8 (5.1) 0.71	5 (15.6) vs. 6 (2.3) 0.002	3 (14.2) vs. 8 (4.1) 0.09
Mania (%)	2 (3.2) vs. 1 (1.6) 0.58	1 (3.1) vs. 3 (1.4) 0.67	0 (0) vs. 3 (1.5) 0.009
ODD (%)	3 (4.9) vs. 3 (1.9) 0.33	2 (6.3) vs. 5 (2.3) 0.41	1 (4.7) vs. 6 (3.1) 0.86
Depression (%)	3 (4.9) vs. 3 (1.9) 0.35	1 (3.1) vs. 6 (2.7) 0.87	3 (14.2) vs. 4 (2.0) 0.007
Eating disorder (%)	3 (4.9) vs. 11 (7.1) 0.42	1 (3.1) vs. 15 (6.8) 0.68	3 (14.2) vs. 13 (6.8) 0.31
Specific phobia (%)	5 (8.2) vs. 9 (5.8) 0.37	2 (6.3) vs. 12 (6.8) 0.97	2 (9.5) vs. 11 (5.7) 0.63
Generalized anxiety (%)	2 (3.2) vs. 0 (0) 0.33	3 (9.4) vs. 2 (0.9) 0.007	1 (4.7) vs. 4 (2.0) 0.23
Agoraphobia (%)	4 (6.6) vs. 1 (1.6) 0.24	0 (0) vs. 6 (0.2) 0.11	1 (4.7) vs. 3 (1.5) 0.24
Separation anxiety (%)	2 (3.2) vs. 2 (1.3) 0.53	0 (0) vs. 4 (1.8) 0.78	1 (4.7) vs. 3 (1.5) 0.42
Panic attack (%)	2 (3.2) vs. 5 (3.2) 0.01	0 (0) vs. 7 (3.2) 0.64	2 (9.5) vs. 5 (2.6) 0.16
Sleep complaints (%)	6 (9.8) vs. 4 (2.6) 0.01	0 (0) vs.11 (5.0) 0.40	2 (9.5) vs. 10 (5.2) 0.46
ASD Median (IQR)	1.0 (0;2.5) vs. 0.5 (0;1.0) 0.03	1.7 (0.5;3.7) vs. 0.5 (0;1.5) 0.008	0.5 (0;1) vs. 0.5 (0;2) 0.12

Tics and Academic performance

TD= Tic disorders; GR= Grade retention; LD= Learning disability; PSD= Posttraumatic stress disorder; ODD=Oppositional defiant disorder; Autism Spectrum disorders (ASD), attention deficit hyperactivity disorder (ADHD), and OCD (obsessive compulsive disorder). In these cells, there are missing data so that the total number of participants does not add up for cases or for controls. The frequency was calculated based on available data.

Table 2. Sociodemographics and clinical comparisons

	With vs. without TD N=61 vs. 156 <i>P</i> value	With vs. without GR N=32 vs. 219 <i>P</i> value	With vs without LD* N=21 vs. 191 <i>P</i> value
Demographic & Clinical Characteristics			
Age (years)	14 (13;15) vs. 14 (12;15)	14 (12;15) vs.14 (12;15)	14 (12;14) vs. 13 (12.;15)
Median (IQR)	0.32	0.78	0.35
Gender (males %)	39 (63.9) vs. 82 (52.6)	23 (68.0) vs. 122 (55.0)	12 (57.0) vs. 105 (55.0)
	0.17	0.15	0.85
Intelligence quotient	101.0 (89.0;107.5) vs. 99.0 (90.0;105.0)	94.0 (80.0;100.5) vs. 102.0 (93.2;108.2)	101.0 (83.0;107.0) vs. 100.0
Median (IQR)	0.87	0.02	(92.0;107.5)
			0.46
Body Mass Index (Kg/m ²)	20.2 (18.3;22.2) vs. 19.9 (18.;22.0)	18.6 (16.4;19.9) vs. 20.0 (18.1;21.92)	19.4 (16.6;20.7) vs. 19.3 (18.2; 20.0)
Median (IQR)	0.85	0.13	0.20
Pharmacological treatment (%)	4 (6.6) vs. 11 (7.1)	3 (8.8) vs. 15 (6.7)	2 (9.5) vs. 17 (8.9)
	1.00	0.46	0.64
Family history of tics (%)	8 (13.1) vs. 6 (3.8)	2 (5.9) vs. 15 (6.7)	4 (19.0) vs. 13 (6.8)
	0.02	1.00	0.03
Quality of life score (8-12y) **	105.0 (95.0;128.7) vs. 122.5 (106.2;137.5)	127.5 (102.5;135.0) vs. 122.5 (105.0;132.5)	107.5 (92.5;132.5) vs. 123 (106.0;132.0)
Median (IQR)	0.26	0.68	0.52
Quality of life score (13-18y) **	115.0 (103.7;122.5.1) vs. 115.0 (105;127.5)	107.5 (95;116.2) vs. 115 (105.0;130.0)	100.7 (93.5;116.2) vs. 115 (105;127.5)
Mean (IQR)	0.70	0.02	0.01
School and Teacher characteristics			
Located in Urban school (%)	28 (45.9) vs. 88 (56.4)	22 (64.7) vs. 110 (49.3)	11 (52.0) vs. 34 (43.0)
	0.17	0.10	0.76
Located in Public school (%)	35 (57.4) vs. 74 (47.4)	14 (41.2) vs. 116 (52)	11 (52.0) vs. 36 (50.0)
	0.20	0.10	0.85
Located in State-AS (%)	26 (42.6) vs 82 (52.6)	20 (58.8) vs 109 (48.9)	10 (48.0) vs. 35 (49.5)
	0.22	0.10	0.85
Academic support at school (%)	7 (11.4) vs. 16.0 (10.3)	11 (32.4) vs. 13 (5.8)	7 (33.3) vs. 17 (8.9)
	0.20	<0.0001	0.006
Psychological support at school (%)	55 (90.2) vs. 136 (87.2)	21 (65.6) vs. 200 (91.3)	17 (81.0) vs. 166 (86.9)
	0.47	0.001	0.30
Marks last trimester**	5.7 (4.7;6.6) vs. 6.3 (5.5;7.3)	4.3 (3.8;5.2) vs. 6.2 (5.4;7.0)	5.3 (4.3;6.) vs. 6.0 (5.2;7.0)
Mean (SD)	0.008	<0.0001	0.01
Grade retention (%)	10 (16.4) vs 13 (8.3)	–	6 (28.6) vs. 26 (13.6)
	0.13		0.10
Teacher. Years of experience	11.0 (1.4) vs. 12.5 (3.1)	14 (2.5) vs. 10 (3.2)	12 (10.0;12.0) vs. 11 (10.0;15.7)
Mean (SD)	0.37	0.02	0.90
Teacher/student ratio	22 (21;24) vs. 22 (20;24)	22 (17.1; 22) vs. 22 (20;24.4)	22.5 (20.7;24.4) vs. 22.0 (20.5;24.4)
Median (IQR)	0.74	0.01	0.98
Learning Disabilities (%)	12 (57.1) vs. 7 (33.3)	6 (28.6) vs. 15 (71.4)	–
	0.01	0.10	
Environmental characteristics			
Sports practice (%)	23 (37.7) vs. 67 (42.9)	6 (17.6) vs. 94 (42.2)	7 (33.3) vs. 94 (49.3)
	0.57	0.001	0.24
Electronic games	11 (18.0) vs. 21 (13.5)	7 (20.6) vs. 29 (13.0)	5 (23.8) vs. 31 (16.2)
>1 hour a day (%)	0.12	0.78	0.01

Tics and Academic performance

TV exposure >1 hour a day (%)	17 (27.9) vs. 39 (25.0) 0.60	12 (36.3) vs. 52 (23.3) 0.08	6 (28.5) vs. 58 (30.3) 0.02
Father high school completed (%)	45 (78.9) vs. 94 (62.7)	10 (29.4) vs. 131 (58.7)	14 (66.6) vs. 139 (72.7)
Mother high school completed (%)	0.10 42 (70.0) vs. 87 (56.9) 0.06	0.002 11 (32.3) vs. 49 (68.1) <0.0001	0.73 12 (57.1) vs. 145 (75.9) 0.28

TD= Tics disorders; State-AS= State assisted-schools; LD= Learning Disability. GR= Grade retention. In these cells, there are missing data so that the total number of participants does not add up for cases or for controls. * In the comparative analysis of students with/without LD, students with an IQ < 70 were excluded; **Quality of life (psychosocial domain). LD was established based on psychoeducational assessments. Marks range from 0 to 10, by being < 5 (inadequate) and ≥ 5 (adequate).

Table 3. Cox Regression of Model [grade retention as the dependent variable]

N=122	B	ET	Wald	P value	Harzard Ratio	95% CI
Tic disorders (yes)	0.01	0.73	0.000	0.98	1.01	0.24-4.24
Psychologist support (no)	-2.54	0.67	14.20	<0.0001	12.79	3.39-48.17
Sport performance (no)	1.85	0.72	6.56	0.01	6.41	1.54-26.78

Model fitness: Omnibus test of model coefficients. -2 Log Likelihood=63.83, overall score (Chi-square=29.45, $p<0.0001$); change from previous step (Chi-square=18.94, $p<0.0001$); change from previous block (Chi-square= 18.94; $p<0.0001$).

Table 4. Logistic regression model (Learning disability as the dependent variable)

N=122	B	ET	Wald	P value	Odds Ratio	95% CI
Tic disorders (yes)	2.45	0.84	8.42	0.004	11.62	2.21-60.90
ADHD (yes)	1.89	0.74	6.51	0.01	6.63	1.55-28.37

ADHD= Attention deficit & Hyperactivity disorder. This model classified 45.5% of the students with LD and 95.8% of the students without LD. Model fitness: Hosmer& Lemeshow test $p=0.99$.