



Moderating Role of Depression on the Association of Tic Severity with Functional Impairment in Children

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Introduction

Chronic tic disorders (CTDs) commonly co-occur with other psychiatric disorders. CTDs have been linked to functional impairment and reduction in quality of life. Insufficient research is available on depressive symptoms in patients with CTD, especially children and adolescents, yielding conflicting findings.

Objectives

To investigate the presence of depressive symptoms in a cohort of children and young adolescents with CTD, and to test whether they moderate the link between tic severity and functional impairment.

Methods

The sample consisted of 85 children and adolescents (6-18 years; $m=10.9\pm2.63$; 80% males) with a CTD (59% with TS) who were treated in a large referral center. Participants were evaluated using gold standard self and clinician-reporting instruments to measure tic symptom severity and tic-related functional impairment (Yale Global Tic Severity Scale); depression (Child Depression Inventory); and obsessive-compulsive symptoms (Children Yale Brown Obsessive Compulsive Scale) as well as Attention Deficit Hyperactivity Disorder (ADHD) diagnosis.

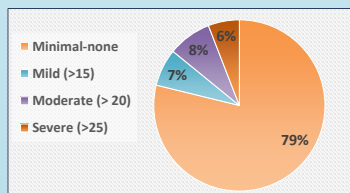


Figure 1: Distribution of Depressive Symptoms according to CDI scores (n=85)

Results

Depressive symptoms (mild to severe) were exhibited by 21% of our sample (Figure 1). Study participants with CTD and comorbid ADHD (50.6%) and/or OCD (12.9%) had higher rates of depressive symptoms compared to those without comorbidities. Significant correlations were found within and among all tic related and OCD related measures, yet depressive symptoms only correlated to tic-related functional impairment (Table 1). Depression significantly and positively moderated the correlation between tic severity and tic related functional impairment (Table 2 and Figure 2).

Table 1 Correlations[†] Matrix for Study Measures (n=85)

	Total Tic Severity (YGTSS)	Tic Impairment (YGTSS)	OCD Symptom severity (CY-BOCS)	Obsessive Symptom Severity (CY-BOCS)	Compulsive Symptom Severity (CY-BOCS)	ADHD Diagnosis (yes/no)
Depressive Symptoms (CDI)	0.08 $p = 0.48$	0.23* $p = 0.033$	0.08 $p < 0.001$	0.05 $p = 0.625$	0.08 $p = 0.473$	0.14 $p = 0.205$
Total Tic Severity (YGTSS)		0.56** $p < 0.001$	0.31** $p < 0.001$	0.24* $p = 0.029$	0.29** $p = 0.008$	0.057 $p = 0.562$
Tic Impairment (YGTSS)			0.33** $p < 0.001$	0.24* $p = 0.020$	0.33** $p < 0.001$	-0.04 $p = 0.748$
OCD symptom severity (CY-BOCS)				0.89** $p < 0.001$	0.85** $p < 0.001$	0.08 $p = 0.479$
Obsessive Symptoms Severity (CY-BOCS)					0.51** $p < 0.001$	0.01 $p = 0.909$
Compulsive Symptom Severity (CY-BOCS)						0.12 $p = 0.294$

[†] Pearson Correlation Point Biserial as needed; * $p < 0.05$ ** $p < 0.01$

Table 2 Hierarchal Regression Model for Predicting Tic-Related Functional Impairment in 85 children and adolescents (6-18 years) with CTD

	Unstandardized coefficients		Standardized coefficients				
Variables	B	SE	β	p	ΔR ²	ΔF	p _{ΔF}
Step 1							
Age	0.04	0.10	0.04	0.72	4.01	0.090 (2,76)	0.022
Sex	-0.20	0.11	-0.19	0.08			
ADHD diagnosis	-0.05	0.10	-0.05	0.61			
OCD Severity	0.22	0.11	0.30	0.01			
Step 2							
Age	0.07	0.09	0.08	0.40	15.98	0.258 (2,74)	<0.001
Sex	-0.07	0.10	-0.07	0.46			
ADHD diagnosis	-0.14	0.09	-0.14	0.13			
OCD Severity	0.16	0.10	0.15	0.11			
Depressive symptoms	0.20	0.09	0.20	0.03			
Total Tic Severity	0.49	0.09	0.51	<0.001			
Step 3							
Age	0.12	0.09	0.12	0.19	5.92	0.045 (1,73)	0.017
Sex	-0.09	0.09	-0.09	0.35			
ADHD diagnosis	-0.11	0.09	-0.12	0.20			
OCD Severity	0.19	0.10	0.18	0.05			
Depressive symptoms	0.19	0.09	0.20	0.03			
Total Tic Severity	0.43	0.10	0.44	<0.001			
Interaction (Total Tic severity X depressive symptoms)	0.19	0.08	0.23	0.02			
For the full model R ² =0.45, F _(9,68) =8.47, p<0.001							

For the full model $R^2=0.45$, $F_{(7,89)}=8.47$, $p<0.001$

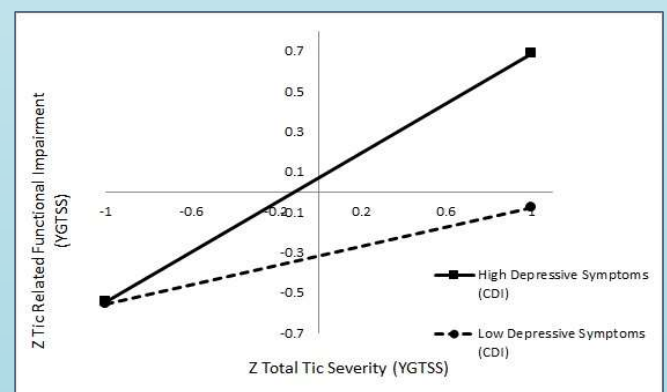


Figure 2

Depressive symptoms (CDI) moderate the correlation between total tic severity and tic-related functional impairment (YGTSS). Simple slope analysis was conducted, high and low levels of depressive symptoms were considered as one standard deviation above or below the mean, respectively (n=85).

Conclusions

Findings suggest that depression plays an important part as a moderator in the link between tic severity and functional impairment in children and adolescents. Our study highlights the importance of screening for and treating depression in patients with CTD.