Tourette's Disorder: Tears, Fears..... and Years

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Disclosures (Past 24 Months)

- American Academy of Child and Adolescent Psychiatry: Honoraria
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- Child Mind Institute: Honorarium
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- Emalex: Research Support
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- Tourette Association of America: Scientific Advisory Board; TAA-CDC Partnership
- University of Cincinnati: Honorarium
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THE NEW YORKER

"Young man, go to your room and stay there until your cerebral cortex matures."

WEDNESDAY
JUNE 18

Tourette's Disorder: Tears, Fears….. and Years
Learning Objectives:

By the end of this presentation, the audience participant should be able to:

1. Discuss the **role and impact of anxiety (fears) and depression (tears)** in persistent tic disorders and Tourette's disorder
2. Evaluate what is known about the **risk for suicidal thoughts and behaviors (years)** in youth and adults with persistent tics and Tourette's disorder
3. Describe **new data from the TAA 2022 Impact Survey** on suicidality in youth with Tourette's disorder
4. Review **evidence-based interventions** for anxiety and depression in youth with persistent tics and Tourette's disorder
5. Consider **the gaps in understanding suicidality** in youth and adults with persistent tics and **Tourette's disorder** and discuss options for **collaborative research**

- **Co-occurring psychiatric symptoms/disorders** are common in Tourette's disorder

- They are significantly more common than in the general population

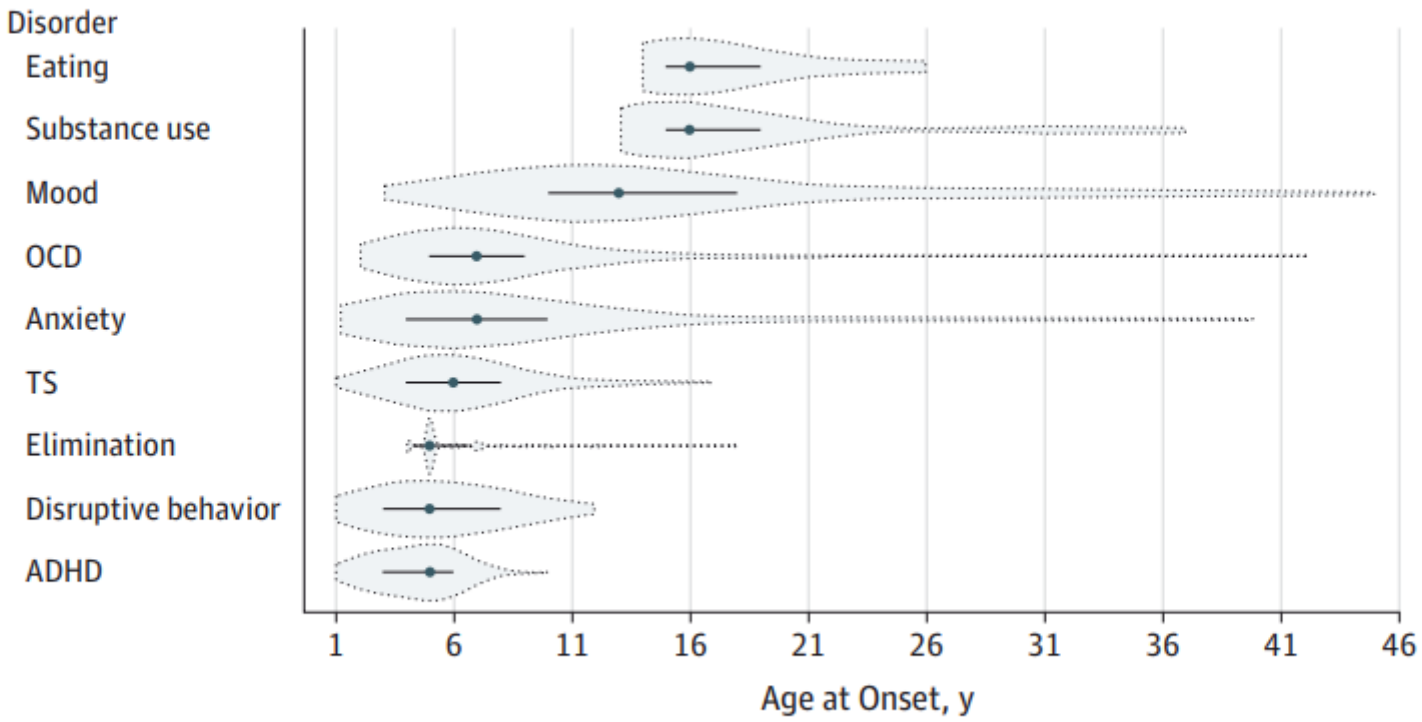
- These conditions contribute to the **distress, impairment and reduced quality of life** that individuals with Tourette's disorder experience

Lifetime Prevalence, Age of Risk, and Genetic Relationships of Comorbid Psychiatric Disorders in Tourette Syndrome

(Hirschtritt, M et al. (2015). JAMA Psych; 2015 Volume 72;4)

- **Design:** Structured diagnostic interviews in TS (n =1374) and TS-unaffected family members (n=1142).
- **Results**: lifetime prevalence: **any psychiatric comorbidity in TS: 85.7%**; 57.7%: 2 or more disorders.
- **72.1% had OCD/ADHD. Other disorders (mood, anxiety, DBD) each 30%.**
- **Age of greatest risk for onset of most comorbid psychiatric disorders was 4-10 years.**
- **TS**: **increased risk of anxiety** (OR: 1.4; P = .04) independent of OCD/ADHD;
- **High rates of mood disorders** (29.8%) may be due to OCD? (OR, 3.7; P < .001).
- **Conclusion**: TS psychiatric comorbidity is common and begins early.

Figure 2. Ages at Onset for Comorbid Disorders Among Individuals With Tourette Syndrome (TS)



Lifetime Prevalence, Age of Risk, and Genetic Relationships of Comorbid Psychiatric Disorders in Tourette Syndrome

(Hirschtritt ME et al. JAMA Psychiatry; April 2015; Volume 72, Number 4)

Informativeness of Structured Diagnostic Interviews in the Identification of Tourette's Disorder in Referred Youth

(Coffey, B. et al .J. Nerv. Ment. Dis. 2000; Sep;188 (9):583-588)

Clinical and Demographic Characteristics of Non-specialized and Specialized Clinic Patients with TD

	Non-specialized Clinic patients (N=92)		Specialized Clinic patients (N=103)		Overall Significance
	Mean	**SD**	**Mean**	**SD**	***p***
Current Age	10.8	3.23	10.8	3.62	0.89
SES	2.0	1.13	2.2	1.24	0.42
	N	**%**	**N**	**%**	***p***
Past GAS	47.9	7.50	48.6	7.57	0.54
Current GAS	51.3	7.32	51.9	6.52	0.55
% Male	82	90	81	80	0.06

Comorbidity of TD Subjects by Ascertained Site:
Mood Disorders

(Coffey, B. et al .J. Nerv. Ment. Dis. 2000; Sep;188 (9):583-588)

	Non-specialized Clinic Patients (N = 92)		Specialized Clinic Patients (N = 103)		Overall Significance
Diagnosis	**N**	**%**	**N**	**%**	***p***
Pure TD (Non-comorbid)	2	2	5	5	.31
Major Depressive Disorder	45	49	56	54	.49
Any Bipolar Disorder	20	22	16	16	.24
Dysthymia	9	10	4	4	.09
Any Mood Disorder	55	60	59	57	.65

Distinguishing Illness Severity from Tic Severity in Children and Adolescents with Tourette's Disorder

(*Coffey B, Biederman J, Geller D, et al. Journal of the American Academy of Child and Adolescent Psychiatry 2000; 39(5):556-561).*

- **Design:** N=156 consecutively referred youth ages 5-20 cross-sectionally evaluated with KSADS in a major academic center
- **Results**: 19 (12%) required hospitalization (illness measure)
  Current age, TD severity, TD duration, OCD, MDD, psychosis, bipolar disorder, panic disorder and overanxious disorder were univariate predictors of hospitalization
- **Major depression (p<0.016) and bipolar disorder (p<0.001) were more robust predictors of illness impairment manifest by hospitalization in youth with TD than severe tics (0.05)**
- Same findings were reported **using GAF <50** as a dimensional outcome variable
- **Conclusion**: Comorbid mood disorders are highly associated with illness impairment/morbidity in youth with TD, stressing the importance of comorbidity and non-tic aspects of the phenotype.

Table 5 Demographic and Clinical Characteristics of TD Illness (n = 156)

	No hospitalization (n = 137)		Past hospitalization (n = 19)		Significance (χ^2)
	Mean	SD	Mean	SD	p
Current age	10.5	3.0	14.4	3.2	0.001
SES	2.1	1.1	2.5	1.5	ns
Past GAF	51.0	6.1	37.9	6.4	0.001
Current GAF	53.7	5.7	44.7	8.3	0.001
	n	%	n	%	
Gender (% male)	112	82.4	16	84.2	ns
TD duration	4.5	3.2	6.9	4.7	0.0058
TD impairment (worst ever)[a]					0.007
Mild	52.0	38.5	2.0	11.1	
Moderate	52.0	38.5	6.0	33.3	
Severe	31.0	23.0	10.0	55.6	

[a] p = 0.003 between mild and severe.

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Table 6 Comorbidity of Hospitalized vs. Nonhospitalized TD Subjects (n = 156)

	No hospitalization (n = 137)		Past hospitalization (n = 19)		Significance
Diagnosis	n	%	n	%	p
Mood disorders					
Major depressive disorder	59	43.4	17	89.5	0.001
Bipolar disorder	13	9.6	11	57.9	0.001
Dysthymia	10	7.4	0	0	ns
Any mood disorder	68	50	18	94.7	0.001
Anxiety disorders					
Panic disorder	14	10.3	7	36.8	0.002
Agoraphobia	30	22.4	6	31.6	ns
Social phobia	15	11.1	4	21.1	ns
Simple phobia	43	31.9	4	21.1	ns
OCD	30	22.1	10	52.6	0.004
Overanxious disorder	36	26.7	11	61.1	0.003
Separation anxiety	36	26.9	9	50	0.044
Multiple (2+) anxiety disorders (not OCD)	47	34.8	10	52.6	ns
Any anxiety disorder	77	56.6	13	68.4	ns

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Psychosocial Outcome and Psychiatric Comorbidity in Older Adolescents with Tourette Syndrome

(Gorman, D. Thompson, N. Plessen, K. Robertson, M. Leckman, J. and Peterson, B.; Br J Psych; 2010; 197; 36-44)

- **Aim:** To compare psychosocial outcome and lifetime comorbidity rates in older adolescents with TD and controls
- **Design:** N=65 with TD identified in childhood, and 65 matched community controls, assessed at age 18
- **Results:** Compared with controls, **TD individuals had substantially lower CGAS scores** and **higher rates of ADHD, MDD, and CD (p <0.01).**
- In those with TD, **poorer psychosocial outcomes were associated with greater ADHD, OCD and tic severity.**
- **TD individuals** were **more likely to have MDD even when ADHD was controlled for**.
- **Conclusion**: Clinically referred youth with TD have impaired psychosocial outcome and high comorbidity rates in late adolescence.

Comparison of Lifetime Psychiatric Disorders in the Tourette Syndrome group and Community controls

(Gorman et al, BJ Psych, 2010)

	Tourette syndrome ($n=65$)	Controls ($n=65$)	Test statistic		Conditional logistic regression			
							Controlling for a lifetime diagnosis of ADHD	
	n (%)	*n* (%)	χ^2 (d.f. = 1)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*
Any psychiatric disorder (including OCD)[a,b]	61 (93.8)	–	–	–	–	–	–	–
Any psychiatric disorder except OCD	60 (92.3)	37 (56.9)	21.5	**$<10^{-5}$**	21.5 (2.9–161.1)	**<0.01**	9.3 (1.2–74.3)	**0.04**
ADHD	43 (66.2)	9 (13.8)	37.1	**10^{-9}**	7.3 (2.8–19.5)	**10^{-4}**	–	–
OCD[b]	25 (38.5)	–	–	–	–	–	–	–
Anxiety disorder (non-OCD)[c]	26 (40.0)	16 (24.6)	3.5	0.06	2.0 (0.8–4.8)	0.1	1.8 (0.6–5.0)	0.3
Learning disorder[d]	27 (41.5)	8 (12.3)	14.1	**<0.001**	7.9 (2.2–28.2)	**0.001**	3.5 (0.9–14.4)	0.08
Stuttering	8 (12.3)	5 (7.7)	0.8	0.4	2.2 (0.5–9.7)	0.3	3.0 (0.5–17.4)	0.2
Conduct disorder	15 (23.1)	2 (3.1)	11.4	**0.001**	7.8 (1.7–36.8)	**0.01**	3.7 (0.7–21.5)	0.1
Major depressive disorder	40 (61.5)	17 (26.2)	16.5	**10^{-4}**	4.2 (1.8–9.7)	**0.001**	3.6 (1.4–9.2)	**0.01**
Dysthymic disorder	7 (10.8)	3 (4.6)	1.7	0.2	3.8 (0.9–16.7)	0.08	3.0 (0.5–19.0)	0.2
Bipolar disorder	4 (6.2)	0 (0.0)	2.3[g]	0.1	–	–	–	–
Primary psychotic disorder[e]	5 (7.7)	0 (0.0)	3.3[g]	0.07	–	–	–	–
Substance use disorder[f]	9 (13.8)	6 (9.2)	0.7	0.4	1.7 (0.5–6.1)	0.4	0.7 (0.1–3.8)	0.7

Anxiety Disorders and Tic Severity in Juveniles with Tourette's Disorder

(Coffey B, Biederman J, Smoller, J, et al. Journal of the American Academy of Child and Adolescent Psychiatry 2000; 39(5):562-568).

- **Design:** N=190 consecutively referred youth ages 5-20 cross-sectionally evaluated with KSADS in a major academic center
- **Results**: 134 (71%) had mild-moderate tic severity and 56 (29%) severe tics
- No differences in mood or DBD.
- OCD was more common in the severe group, but did not reach statistical significance
- **Excluding phobias, all other anxiety disorders were more clearly over-represented among severe TD.**
- **Separation anxiety disorder (SAD) most robustly predicted severe TD.**
- **Conclusion:** Non-OCD anxiety disorders, and specifically SAD, may be significantly associated with tic severity in referred TD patients.

TABLE 1

Demographic Characteristics of Sample With Mild/Moderate Versus Severe Tourette's Disorder (N = 190)

Demographic Characteristics	Mild/ Moderate TD (n = 134)		Severe TD (n = 56)		Significance (p)
	Mean	SD	Mean	SD	
Current age (yr)	10.2	3.3	12.0	3.4	<.001
SES[a]	2.03	1.1	2.25	1.33	.30
	No.	%	No.	%	
Gender (% male)	113	84	49	88	.57

Note: The p values were derived from one-way analysis of variance (current age and SES) and χ^2 test (gender). TD = Tourette's disorder; SES = socioeconomic status.

[a] Hollingshead and Redlich (1958).

Anxiety Disorders and Tic Severity

(Coffey et al JAACAP 2000)

TABLE 3

Comorbidity by Tourette's Disorder Severity of Sample With Mild/Moderate Versus Severe Tourette's Disorder (N = 190)

Diagnosis	Mild/Moderate TD (n = 134)		Severe TD (n = 56)		Significance: χ^2
	No.	%	No.	%	(p)
Any comorbidity	127	94.8	56	100	.08
Mood disorders					
Major depressive disorder	66	49.3	33	58.9	.22
Bipolar disorder	19	14.2	16	28.6	.02
Dysthymia	9	6.7	4	7.1	.92
Any mood disorder	75	56.0	36	64.3	.29
Anxiety disorders					
Panic disorder	12	9.0	13	23.2	.01
Agoraphobia	25	19.0	22	39.3	.001
Social phobia	14	10.5	6	10.7	.97
Simple phobia	34	25.6	21	38.2	.08
OCD	33	24.8	23	41.8	.02
Overanxious disorder	36	27.1	25	45.5	.01
Separation anxiety	32	24.2	28	50.9	.001
Any anxiety disorder	71	53.0	39	69.6	.03
Multiple (≥2) anxiety disorders	43	32.3	30	53.6	.01
ADHD	102	76.1	45	80.4	.52
Conduct disorder	20	15.0	11	19.6	.44
Oppositional defiant disorder	78	58.7	39	70.9	.12
Any disruptive disorder	113	85.0	52	92.9	.14

Anxiety Disorders and Tic Severity

(Coffey et al; JAACAP 2000)

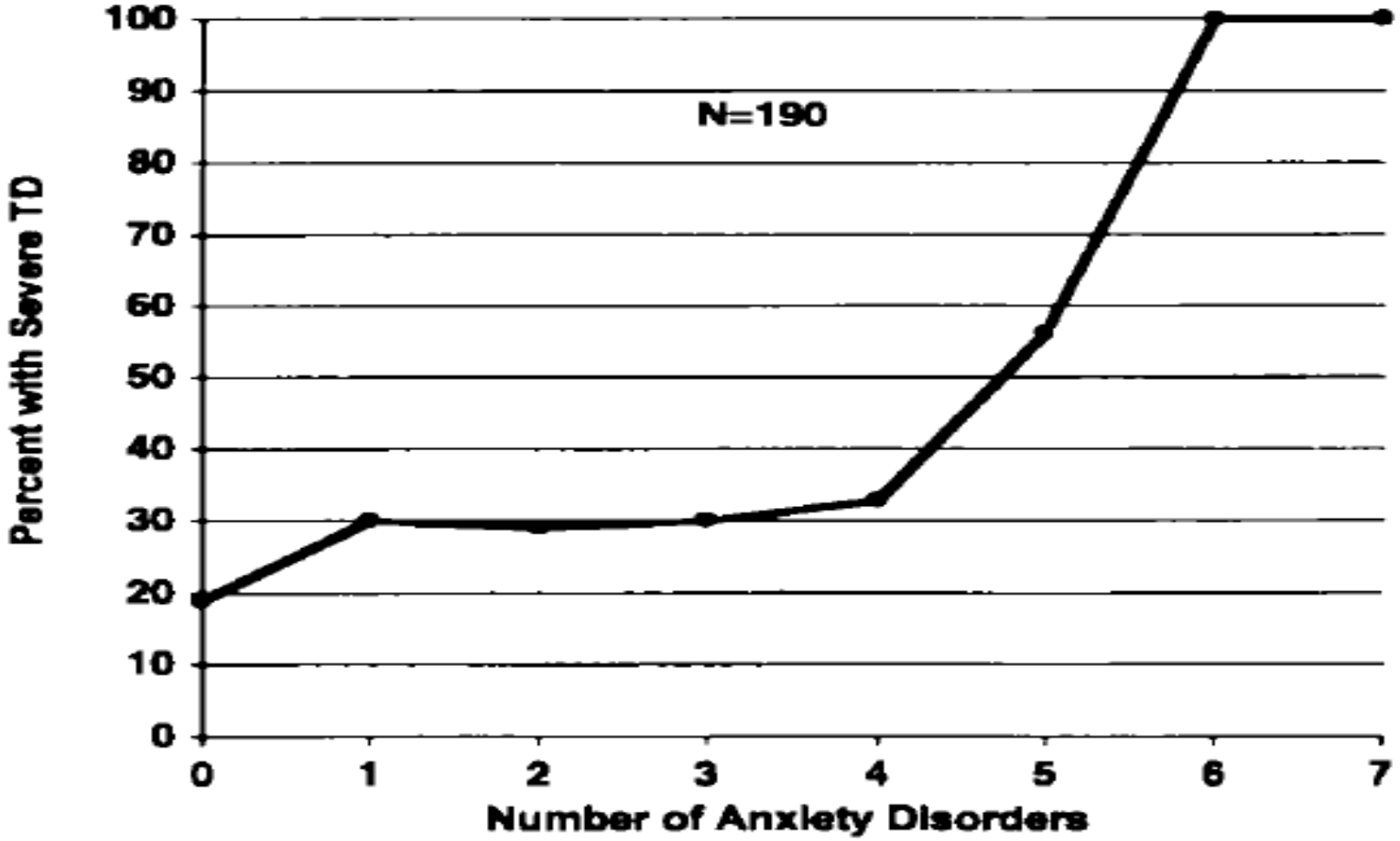


Fig. 1 Number of anxiety disorders and severity of Tourette's disorder (TD).

Anxiety Disorders and Tic Severity *(Coffey et al JAACAP 2000)*

Anxiety Symptoms Differ in Youth With and Without Tic Disorders

(Vermilion, J., Pedraza, C., Augustine, E.F. et al Child Psychiatry Hum Dev 52, 301–310 (2021). https://doi.org/10.1007/s10578-020-01012-6)

Objective: Compare **anxiety symptoms** in Youth With and Without Tic Disorders. Multidimensional Anxiety Scale for Children (MASC) scores were compared among youth with tics, a community control group, and participants in Child/Adolescent Anxiety Multimodal Treatment Study (CAMS) seeking treatment for anxiety.

Methods: N=176 children with tics; 93 controls; 488 in the CAMS study.
Results: Compared to youth with tic disorders, community controls had lower MASC scores ($p<0.0001$).

Youth with tic disorders had **MASC scores comparable to those seeking anxiety treatment** in CAMS ($P<0.13$).

Separation anxiety ($p=0.0003$) and physical symptoms ($P<0.0001$) sub-scale scores were higher in tic patients than in CAMS participants.

Conclusion: Anxiety symptom profiles differ in youth with and without tic disorders which may have treatment implications.

Anxiety Symptoms Differ in Youth With and Without Tic Disorders

(Vermilion, J., Pedraza, C., Augustine, E.F. et al Child Psychiatry Hum Dev 52, 301–310 (2021). https://doi.org/10.1007/s10578-020-01012-6)

Table 2 Subject demographics

	n	Age median (IQR)[a]	Male sex n (%)
Tic disorders	176	11.0 (10.0–14.0)	132 (75%)
Community control	93	11.0 (9.0–13.0)[a]	56 (60%)[c]
CAMS participants	488	11.0 (9.0–13.0) [b]	246 (50%)[d]

IQR interquartile range

Compared to the Tic Disorders group: [a]p=0.27 on Wilcoxon rank sum test; [d]$\chi^2 = 31.90$ $p < 0.0001$

[b]p=0.01 on Wilcoxon rank sum test

[c]$\chi^2 = 6.32$, $p = 0.01$

Anxiety Symptoms Differ in Youth With and Without Tic Disorders

(Vermilion, J., Pedraza, C., Augustine, E.F. et al Child Psychiatry Hum Dev 52, 301–310 (2021). https://doi.org/10.1007/s10578-020-01012-6)

Table 4 MASC scores in youth with tic disorders and youth in the CAMS trial

	Tic disorder median (IQR) (n = 176)	CAMS median (IQR) (n = 488)	p value
MASC total	52.0 (44-60.8)	51.0 (42.0–60.0)	0.13
MASC physical symptoms	52.0 (44.3–58.0)	46.0 (37.0–55.0)	< 0.0001
MASC harm avoidance	43.5 (31.3–53.0)	49.0 (40.0–57.0)	< 0.0001
MASC social phobia	53.0 (47.3–62.0)	51.5 (41.0–63.0)	0.06
MASC Separation Anxiety	59.0 (51.3–70.0)	55.0 (47.0–66.0)	0.0003

MASC Multidimensional Anxiety Scale for Children, *IQR* interquartile range

Anxiety Symptoms Differ in Youth With and Without Tic Disorders

(*Vermilion, J., Pedraza, C., Augustine, E.F. et al Child Psychiatry Hum Dev 52, 301–310 (2021). https://doi.org/10.1007/s10578-020-01012-6)*

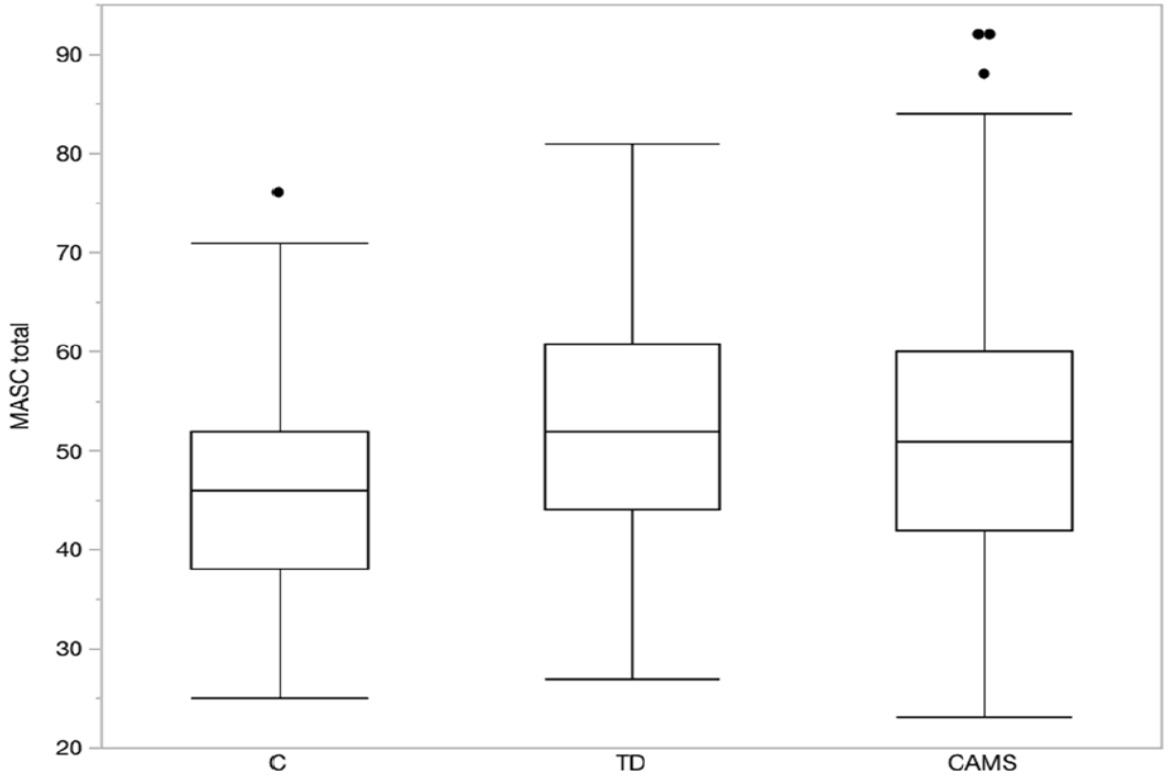


Fig. 1 Youth with tic disorders had higher MASC total scores than community control youth and similar MASC total scores to those of treatment-seeking anxious youth in the CAMS trial. The box represents the interquartile range and the horizontal line inside the box represents the median. The whiskers represent minimum and maximum scores, excluding outliers (black dot). *C* community control subjects, *TD* Tic disorder subjects, *CAMS* CAMS trial participants

Epidemiology of Youth Suicide and Suicidal Behavior

(Cash, S. Bridge, J. Current Opinion in Pediatrics, 2009; 21; Wolters Kluwer Health)

Suicidality and Depression

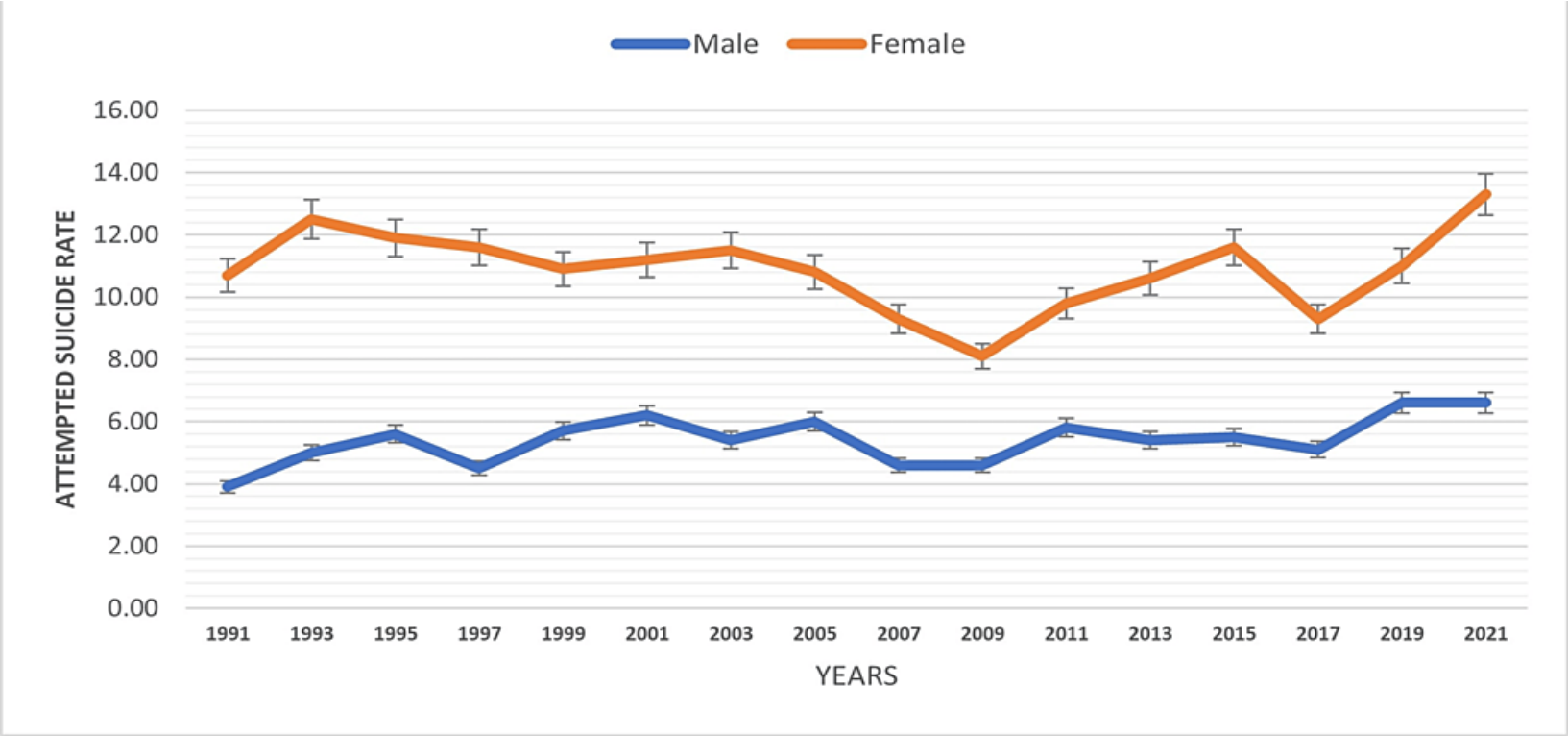
Depression is the primary predictor of suicidal ideation.
Psychological autopsy reports show a substantial link between clinical depression and suicide in adolescents.

Up to 60% of adolescent suicide cases had depression at time of death.

40-80% of adolescents meet diagnostic criteria for depression at time of attempt.

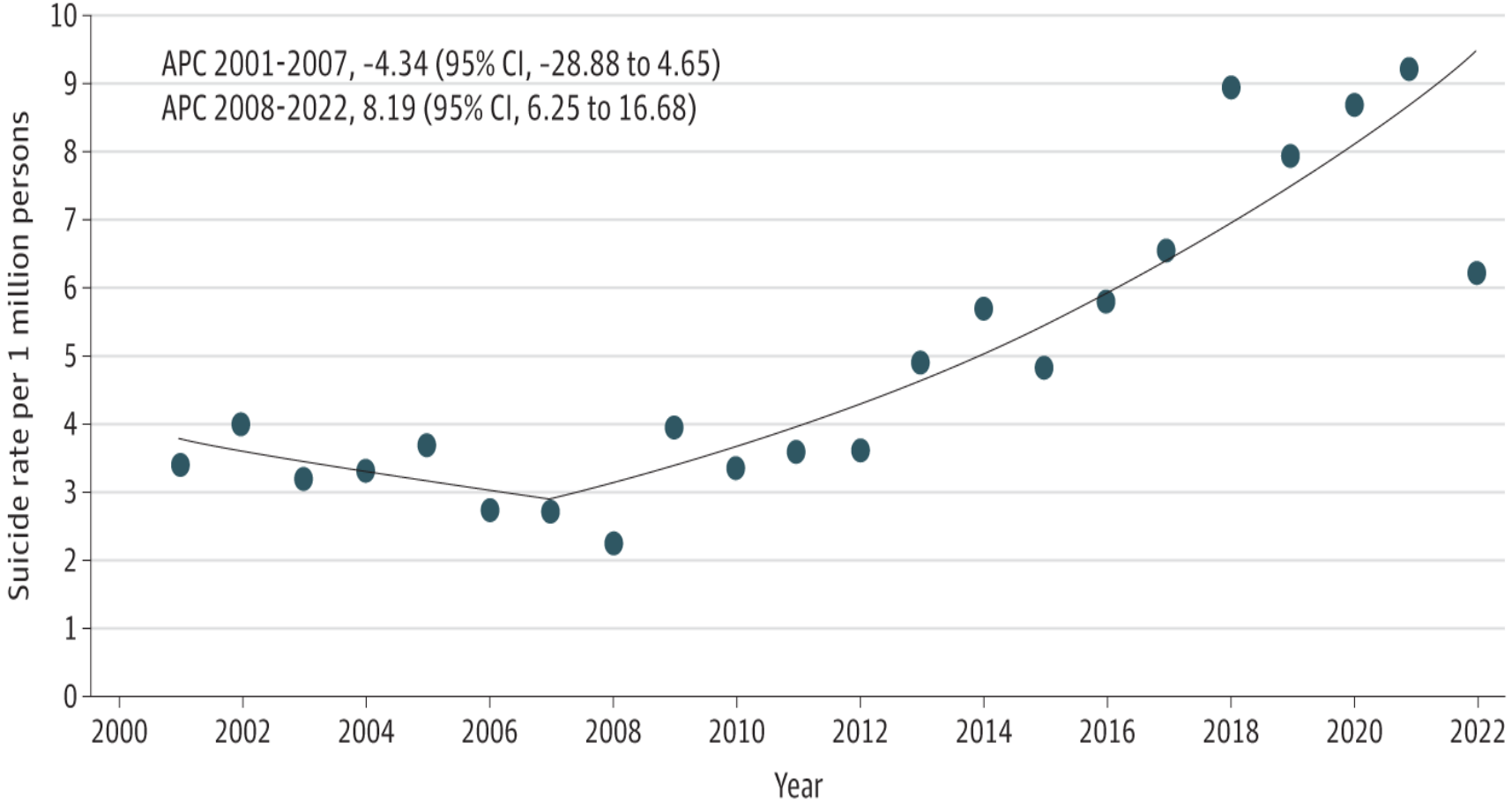
Analyzing Trends in Suicide Attempts Among the Pediatric Population in the United States: A Study Using CDC's Youth Risk Behavior Surveillance System (YRBSS)

(Arisoyin, A. et al. Cureus; 2023; DOI: 10.7759/cureus.44099)



Suicide in US Preteens Aged 8 to 12 Years, 2001 to 2022

(Ruch, D. et al. JAMA Netw Open. 2024;7(7):e2424664. doi:10.1001/jamanetworkopen.2024.24664)



Suicidal Thoughts and Behaviors in Children and Adolescents with Chronic Tic Disorders

(Storch, E. A., Hanks, C. E., Mink, J. W., McGuire, J. F., Adams, H. R., Augustine, E. F., Vierhile, A., Thatcher, A., Bitsko, R., Lewin, A. B., & Murphy, T. K. (2015). SUICIDAL THOUGHTS AND BEHAVIORS IN CHILDREN AND ADOLESCENTS WITH CHRONIC TIC DISORDERS. Depression and anxiety, 32(10), 744–753. https://doi.org/10.1002/da.22357)

Highlights

- **Study sample**: 196 children with chronic tic disorders/Tourette's disorder (CTD) and 100 community control children.
- **Methods**: Children were evaluated with the DISC-P/Y. DISC was administered to parents of children <9 years and to youth 9 and above. Suicidal questions were in the Depression module.
- **Results:** 19 youths (9.7%) in CTD and 3 (3%) in community sample experienced suicidal thoughts and behaviors (STBs).
- **STBs** were often endorsed in context of anger and frustration.
- CBCL anxious/depressed, withdrawn, social problems, thought problems, aggressive behavior subscales + total internalizing problems scale were associated with STBs.
- **Conclusion:** About 10% of youth with CTDs experience suicidal thoughts and behaviors, and these occur in more complicated cases, often in the context of anger and frustration.

Suicidal Thoughts and Behaviors in Children and Adolescents with Chronic Tic Disorders

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Table 1

Demographic Characteristics for Youth with CTD and Community Control Participants

	Total Sample (N = 296) N (%)	Youth with CTD (*n* = 196) N (%)	Community Controls (*n* = 100) N (%)
Male	209 (71%)	149 (76%)	60 (59%)
Race/Ethnicity			
Caucasian	223 (75%)	155 (79%)	68 (68%)
Hispanic	22 (7%)	16 (8%)	6 (6%)
Black	19 (6%)	5 (3%)	14 (14%)
Asian American	4 (1%)	4 (2%)	0 (0%)
Pacific Islander	1 (0.3%)	1(1%)	0 (0%)
Other	24 (8%)	13 (7%)	11 (11%)
Unknown race	3 (1%)	2 (1%)	1(1%)
Children (6-11 years)	166 (56%)	109 (56%)	57 (57%)
Adolescents (12-18 years)	130(44%)	87 (44%)	43 (43%)
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Age	11.21 (2.87)	11.29 (2.93)	11.07 (2.75)

Note: There was no significant difference in age between youth with CTD and community control participants, $t(294)=0.61$, $p=0.54$.

Suicidal Thoughts and Behaviors in Children and Adolescents with Chronic Tic Disorders

(Storch, E. A., Hanks, C. E., Mink, J. W., McGuire, J. F., Adams, H. R., Augustine, E. F., Vierhile, A., Thatcher, A., Bitsko, R., Lewin, A. B., & Murphy, T. K. (2015). SUICIDAL THOUGHTS AND BEHAVIORS IN CHILDREN AND ADOLESCENTS WITH CHRONIC TIC DISORDERS. Depression and anxiety, 32(10), 744–753. https://doi.org/10.1002/da.22357)

Table 4

Predictors of Suicidal Thoughts and/or Behaviors among Youth with CTD (N = 192)

Child Behavior Checklist Subscale	B (SE)	Odds Ratio	95% CI	*p*
Anxious/Depressed T-score	0.06 (0.02)	1.06	1.02, 1.11	0.005
Withdrawn T-Score	0.06 (0.03)	1.07	1.01, 1.12	0.02
Somatic T-score	–0.00 (0.03)	1.00	0.95, 1.05	0.95
Social Problems T-score	0.05 (0.02)	1.05	1.00, 1.10	0.05
Thought Problems T-score	0.07 (0.03)	1.07	1.01, 1.14	0.02
Attention Problems T-score	0.03 (0.02)	1.03	0.99, 1.08	0.19
Rule Breaking T-Score	0.02 (0.03)	1.02	0.96, 1.09	0.56
Aggressive Behavior T-Score	0.05 (0.02)	1.05	1.00, 1.10	0.04
Total Internalizing Scale T-Score	0.06 (0.03)	1.06	1.00, 1.11	0.03
Total Externalizing Scale T-Score	0.04 (0.02)	1.04	0.99, 1.09	0.08

Suicidal Thoughts and Behaviors in Children and Adolescents with Chronic Tic Disorders

(Storch, E. A., Hanks, C. E., Mink, J. W., McGuire, J. F., Adams, H. R., Augustine, E. F., Vierhile, A., Thatcher, A., Bitsko, R., Lewin, A. B., & Murphy, T. K. (2015). SUICIDAL THOUGHTS AND BEHAVIORS IN CHILDREN AND ADOLESCENTS WITH CHRONIC TIC DISORDERS. Depression and anxiety, 32(10), 744–753. https://doi.org/10.1002/da.22357)

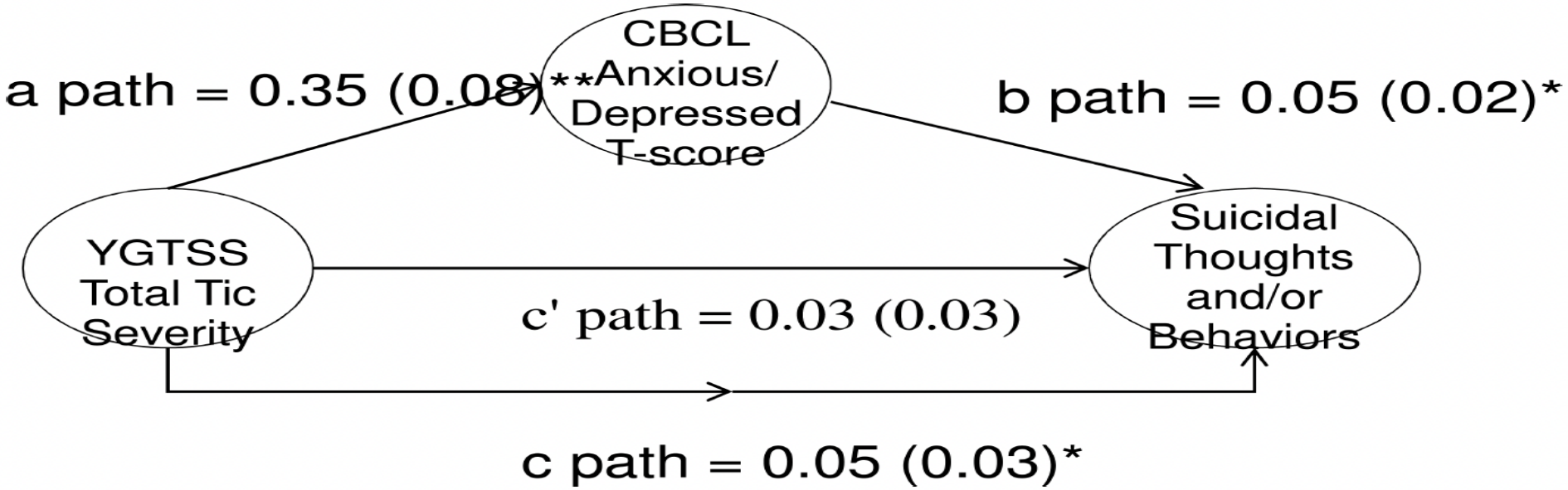

Figure 1.
Parent-reported scores on the Child Behavior Checklist (CBCL) Anxious/Depressed scale mediated the relationship between tic severity and suicidal thoughts and/or behaviors. The c' path takes into account the purposed mediator while the C path does not. Path coefficients and standard error are reported for direct and indirect effects. The $*p < 0.05$, $**p < 0.01$

Suicidal Ideation in Youth with Tic Disorders

(Johnco, C., McGuire, J. F., McBride, N. M., Murphy, T. K., Lewin, A. B., & Storch, E. A. (2016). Suicidal ideation in youth with tic disorders. Journal of affective disorders, 200, 204–211. https://doi.org/10.1016/j.jad.2016.04.027)

Highlights

- **Study sample**: 75 treatment seeking youth with a tic disorder, ages 6-18.
- **Methods:** Measurements were more specific and dove a bit deeper into potential SI correlates.
- **Results:** On the Suicidal Ideation Questionnaire-Junior (SIQ Jr: 15 item self report of SI in past month): **61% of youth with tic disorders** endorsed at least some symptoms of suicidal ideation. **8% of youth** endorsed clinically significant suicidal ideation (above threshold)
- Parents reported **suicidal ideation in 11% of youth** on CBCL (2 items).
- Parents and children did not always agree.
- **Anxiety, depressive** and **externalizing symptoms** (but not tics) were associated with higher suicidal ideation.
- **Conclusion:** Tics were associated with **increased anxiety**, which in turn increased suicidal ideation.
- **Anxiety was associated with SI in younger children and depression in older children.**

Suicidal ideation in Youth with Tic Disorders

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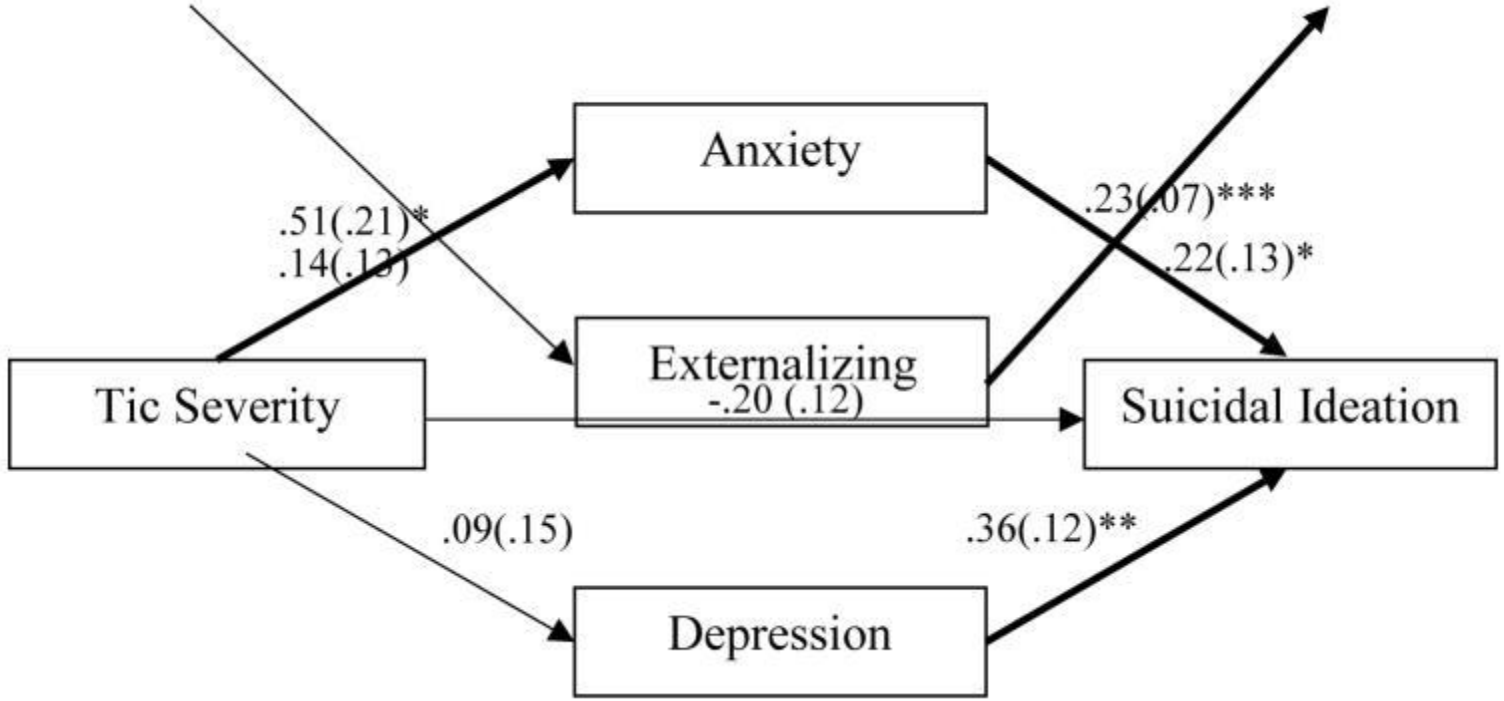

Path model examining whether tic severity increased suicidal ideation in youth with chronic tic disorders via increasing anxiety and depressive symptoms. Values are unstandardized regression coefficients and numbers in parentheses are standard errors. Bolded lines represent significant pathways. *$p < .05$, **$p < .01$, ***$p < .001$.

Mortality Risk in a Nationwide Cohort of Individuals with Tic disorders and with Tourette syndrome

(Meier, S. M., Dalsgaard, S., Mortensen, P. B., Leckman, J. F., & Plessen, K. J. (2017). Mortality risk in a nationwide cohort of individuals with tic disorders and with tourette syndrome. Movement disorders : official journal of the Movement Disorder Society, 32(4), 605–609. https://doi.org/10.1002/mds.26939)

ABSTRACT

Background: Few studies have investigated mortality risk in individuals with tic disorders.

Methods: Danish National Patient Register. **Risk of premature death** in individuals with tic disorders and with Tourette syndrome was measured in a prospective cohort study with 80 million person-years of follow-up.

Mortality rate ratios (MRRs) were estimated and adjusted for calendar year, age, sex, urbanicity, maternal and paternal age, and psychiatric disorders to compare individuals with and without tic disorders.

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ABSTRACT

Results: The **risk of premature death was higher among individuals with tic disorders** (mortality rate ratio, 2.02; 95% CI, 1.49-2.66) **and with Tourette syndrome** (mortality rate ratio, 1.63; 95% CI, 1.11-2.28) compared with controls.

After exclusion of individuals with comorbid ADHD, OCD, and substance abuse, **tic disorders remained associated with increased mortality risk** (mortality rate ratio, 2.30; 95% CI, 1.57-3.23), **as did Tourette syndrome** (mortality rate ratio, 1.81; 95% CI, 1.11–2.75).

Conclusion: Results are of clinical significance for clinicians and advocacy organizations. Several factors may contribute to this increased risk of premature death, and more research is needed.

Mortality Risk in a Nationwide Cohort of Individuals with Tic disorders and Tourette syndrome

(Meier, S. M., Dalsgaard, S., Mortensen, P. B., Leckman, J. F., & Plessen, K. J. (2017). Mortality risk in a nationwide cohort of individuals with tic disorders and with tourette syndrome. Movement disorders : official journal of the Movement Disorder Society, 32(4), 605–609. https://doi.org/10.1002/mds.26939)

TABLE 2. Mortality rate ratios of persons with tic disorders and Tourette syndrome (stratified by comorbidity)

Mortality rate ratio of persons with tic disorders and Tourette syndrome				
	Crude analysis[a]		Adjusted[b]	
Diagnosis	Mortality rate ratio	95% CI	Mortality rate ratio	95% CI
Tic disorders	2.11	1.56-2.78	2.02	1.49-2.66
Tourette syndrome	1.69	1.16-2.38	1.63	1.11-2.28

Mortality rate ratio of persons with tic disorders and Tourette syndrome stratified by comorbidities				
	Tic disorders[b]		Tourette syndrome[b]	
Diagnosis	Mortality rate ratio	95% CI	Mortality rate ratio	95% CI
No comorbid substance use disorders, OCD, or ADHD	2.30	1.57-3.23	1.81	1.11-2.75
Comorbid substance use disorders, OCD, or ADHD	3.75	2.20-5.91	3.14	1.63-5.39

[a]Mortality rate ratios were adjusted for calendar year, age, and the interaction of age with sex.
[b]Mortality rate ratios were adjusted for calendar year, age, place of residence, maternal and paternal age, family history of psychiatric disorders, and the interaction of age with sex.
OCD, obsessive-compulsive disorder; ADHD, attention deficit/hyperactivity disorder.

Suicide in Tourette's and Chronic Tic Disorders

(Fernández de la Cruz, L., Rydell, M., Runeson, B., Brander, G., Rück, C., D'Onofrio, B. M., Larsson, H., Lichtenstein, P., & Mataix-Cols, D. (2017). Suicide in Tourette's and Chronic Tic Disorders. Biological psychiatry, 82(2), 111–118. https://doi.org/10.1016/j.biopsych.2016.08.023)

Abstract

Background: Persons with neuropsychiatric disorders are at increased risk of suicide, but there is little data concerning Tourette's and chronic tic disorders (TD/CTD).

Aim: to **quantify risk of suicidal behavior** in a large nationwide cohort of patients with TD/CTD, establish the contribution of psychiatric comorbidity to this risk, and identify predictors of suicide.

Methods: Using a validated algorithm, 7736 TD/CTD cases were identified in the Swedish National Patient Register during a 44-year period (1969-2013).

Using a matched case-cohort design, patients were compared with general population control subjects (1:10 ratio). Risk of suicidal behavior was estimated using conditional logistic regressions. Predictors of suicidal behavior in the TD/CTD cohort were studied using Cox regression models.

Suicide in Tourette's and Chronic Tic Disorders

(Fernández de la Cruz, L., Rydell, M., Runeson, B., Brander, G., Rück, C., D'Onofrio, B. M., Larsson, H., Lichtenstein, P., & Mataix-Cols, D. (2017). Suicide in Tourette's and Chronic Tic Disorders. Biological psychiatry, 82(2), 111–118. https://doi.org/10.1016/j.biopsych.2016.08.023)

Abstract

Results: In unadjusted models, **TD/CTD patients, compared with control subjects, had an increased risk of both dying by suicide** (odds ratio: 4.39; 95% confidence interval [CI]: 2.89-6.67) **and attempting suicide** (odds ratio: 3.86; 95% CI: 3.50-4.26).

After adjusting for psychiatric comorbidities, the risk was reduced but remained substantial. **Persistence of tics beyond young adulthood and a previous suicide attempt were the strongest predictors of death by suicide in TD/CTD patients** (hazard ratio: 11.39; 95% CI: 3.71-35.02, and hazard ratio: 5.65; 95% CI: 2.21-14.42, respectively).

Conclusion: TD/CTD are associated with substantial risk of suicide.
Suicidal behavior should be monitored in these patients, particularly in those with persistent tics, history of suicide attempts, and psychiatric comorbidities.
Preventive and intervention strategies aimed to reduce the suicidal risk in this group are warranted.

Suicide in Tourette's and Chronic Tic Disorders

(Fernández de la Cruz, L., Rydell, M., Runeson, B., Brander, G., Rück, C., D'Onofrio, B. M., Larsson, H., Lichtenstein, P., & Mataix-Cols, D. (2017). Suicide in Tourette's and Chronic Tic Disorders. Biological psychiatry, 82(2), 111–118. https://doi.org/10.1016/j.biopsych.2016.08.023)

Table 4. Predictors of Suicide and Attempted Suicide in the Cohort of Individuals With TD/CTD (*n* = 7736)

Predictors	Deaths by Suicide, HR (95% CI)	Suicide Attempts, HR (95% CI)
Previous Suicide Attempt	5.65 (2.21–14.42)[a]	—
Persistent TD/CTD[b]	11.39 (3.71–35.02)[a]	1.50 (1.24–1.82)[a]
Woman	0.33 (0.09–1.14)	1.48 (1.22–1.78)[a]
Obsessive-Compulsive Disorder	0.96 (0.37–2.46)	1.24 (1.02–1.50)[a]
Attention-Deficit/Hyperactivity Disorder	0.77 (0.32–1.84)	1.21 (1.01–1.46)[a]
Pervasive Developmental Disorders	0.66 (0.25–1.73)	1.42 (1.19–1.71)[a]
Conduct Disorders	0.59 (0.07–4.68)	1.65 (1.26–2.15)[a]
Psychotic Disorders	1.54 (0.62–3.84)	1.86 (1.49–2.31)[a]
Personality Disorders	2.95 (1.07–8.09)[a]	1.51 (1.20–1.90)[a]
Anxiety Disorders	0.34 (0.12–0.95)	1.39 (1.14–1.70)[a]
Intellectual Disabilities	0.26 (0.03–1.97)	0.96 (0.73–1.27)
Affective Disorders	1.54 (0.67–3.57)	1.67 (1.38–2.03)[a]
Substance Use Disorders	1.38 (0.55–3.47)	3.94 (3.25–4.79)[a]
Other Psychiatric Disorders	0.38 (0.11–1.39)	1.44 (1.18–1.76)[a]
Parental Level of Education		
Elementary vs. secondary	1.31 (0.42–4.10)	1.18 (0.90–1.54)
Elementary vs. higher	1.57 (0.48–5.12)	1.11 (0.84–1.47)

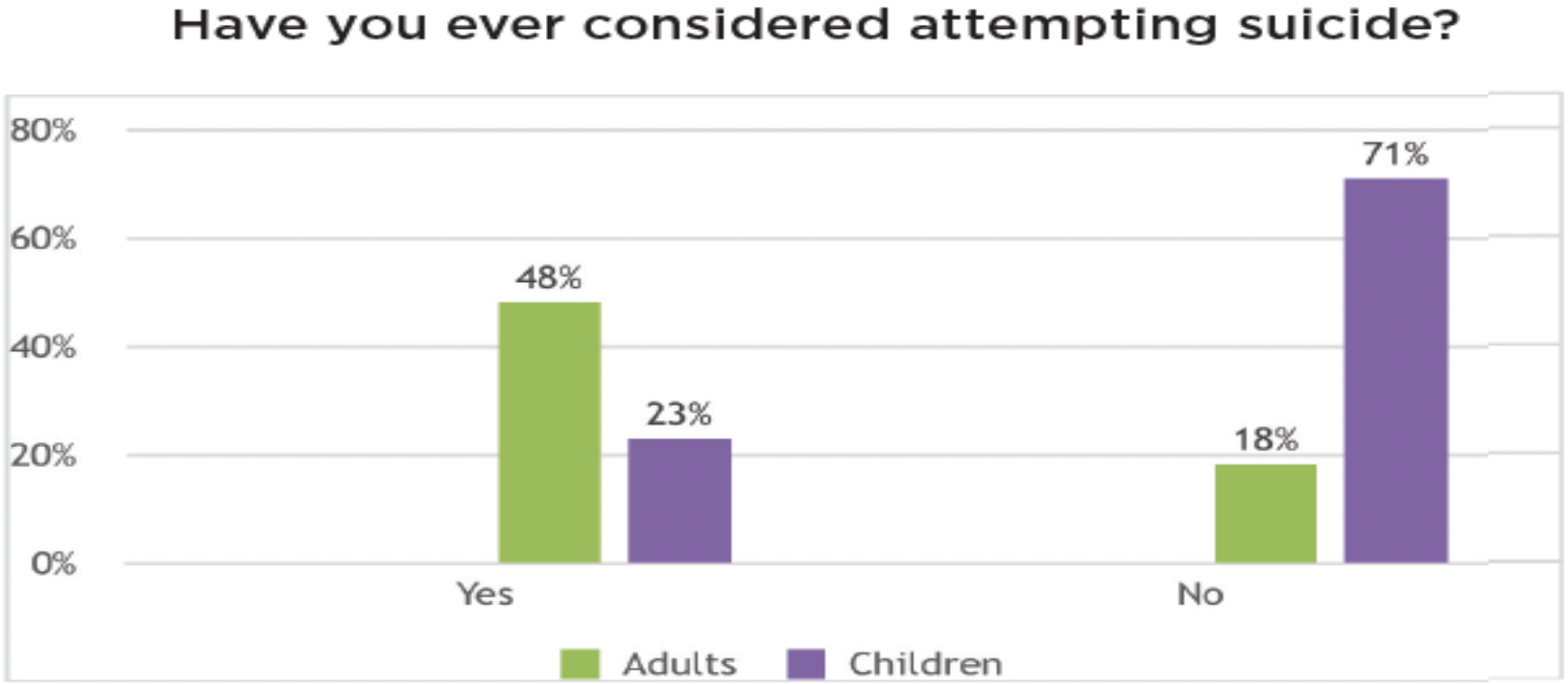
CI, confidence interval; HR, hazard ratio; TD/CTD, Tourette's disorder/chronic tic disorder.
[a]Significant predictors.
[b]Defined as patients who received a diagnosis of TD/CTD beyond 19 years of age.

32% OF CHILDREN WITH A TIC DISORDER HAVE CONSIDERED SUICIDE OR HAVE SELF-HARMED

2018 TAA Impact Survey, AACAP

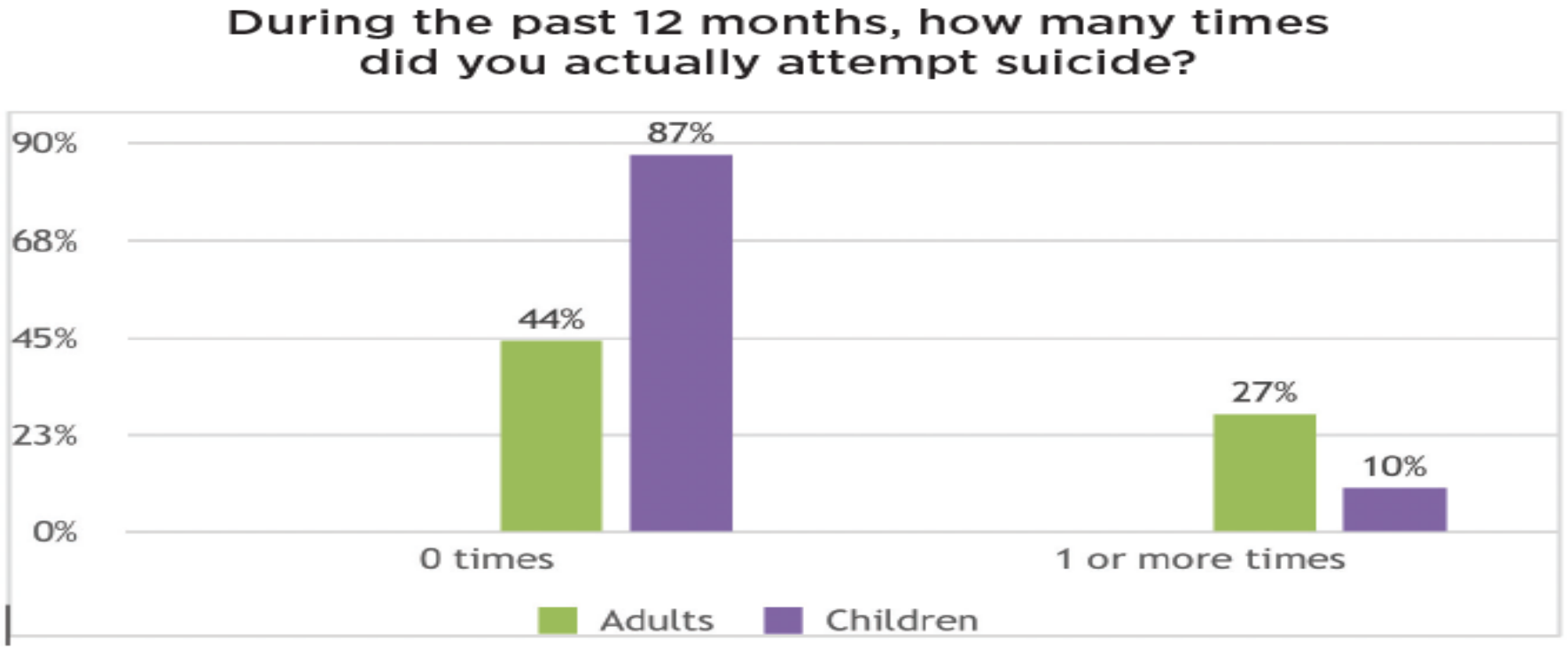
Tourette Association of America 2022 Impact Survey

- 48% of adults and 23% of children have reportedly considered attempting suicide at some point in their lives.



Tourette Association of America 2022 Impact Survey

- 27% of adults and 10% of children attempted suicide in the last 12 months. Outside of the last 12 months, the attempts at suicide ever made increased to 35% for adults and 13% for children.



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Tics and Tourette's disorder, Self-Harm, Suicidal Thoughts and Behavior: Differences Between Boys and Girls (2022 TAA Impact Survey)

(Maria Loreta Lopez, MPH, BA; Mary Elizabeth Gorora, MPH, BS; Jessica D. Leuchter, MD; Avi Botwinick, MD; Katrina Hermetet, PhD; Amanda Talty, BA; Philip D Harvey, PhD; Barbara J. Coffey, MD, MS)

Objective: To examine **sex differences** in the frequency and correlates of self-injurious behavior, self-harm tics and suicidal ideation and behavior in youth with tic disorders and Tourette's disorder.

Methods: This cross-sectional study analyzed data from the 2022 Tourette Association of America online caregiver survey (N = 533 children with tic disorders; 68% male, 32% female). Outcomes included self-injurious behavior, self-harm tics, suicidal ideation and attempts, psychiatric comorbidities, and tic-related pain. Sex differences were assessed using Pearson chi-square and independent sample tests in SPSS v29.

Results: Females had later tic onset (p = .004), more adolescent diagnoses (p < .001), and higher depression (p < .001) and tic-related pain (p = .006).

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Results: Males were diagnosed earlier (p = .006) and had higher ADHD comorbidity (p = .018).
Females were more likely to report self-injurious ideation (p = .014), behavior (p < .001), and recent suicidal ideation (p < .001).

Inadequately treated females had higher rates of lifetime self-injury (p < .001) and suicide attempts (prior p = .022; recent p = .004).

Conclusions: These findings highlight important sex differences in psychiatric comorbidities, self-injury, and suicidality among youth with tic disorders, underscoring the need for early recognition and targeted clinical monitoring, particularly in females.

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Table 1. Demographics

Demographics		Male	Female
		n (%)	n (%)
Race	Native America/Alaskan Native	9 (2.7%)	5 (3.2%)
	Asian	11 (3%)	4 (2.6%)
	Black or African American	3 (1%)	7 (4.5%)
	Native Hawaiian or Pacific Islander	2 (1%)	0 (0.0%)
	Mixed Race	18 (5%)	12 (7.7%)
	White	288 (87%)	128 (82.1%)
	Total	*331 (100%)*	*156 (100.0%)*
Ethnicity	Hispanic or Latino	28 (8%)	13 (8.3%)
Age Group	Under 5 years old	5 (1%)	4 (2.4%)
	5-8 years old	56 (16%)	30 (18.2%)
	9-12 years old	147 (42%)	46 (27.9%)
	13-17 years old	142 (41%)	85 (51.5%)
	Total	*350 (100%)*	*165 (100.0%)*

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Table 2. Age tics were first noticed and age at diagnosis by sex

Age Group	Male, n (%)	Female, n (%)	Difference in Proportions	z Score	p Value
Age First Noticed	*n=359*	*n=173*			
Under 5 years old	150 (41.8%)	62 (35.8%)	+6.0%	1.32	.185
5–8 years old	156 (43.5%)	67 (38.7%)	+4.8%	1.05	.293
9–12 years old	40 (11.1%)	27 (15.6%)	–4.5%	–1.47	.143
13–17 years old	13 (3.6%)	17 (9.8%)	–6.2%	–2.90	.004
Age at Diagnosis	*n=357*	*n=170*			
Under 5 years old	43 (12.0%)	19 (11.2%)	+0.8%	0.25	.803
5–8 years old	190 (53.2%)	71 (41.8%)	+11.4%	2.74	.006
9–12 years old	102 (28.6%)	40 (23.5%)	+5.1%	1.30	.194
13–17 years old	22 (6.2%)	40 (23.5%)	–17.3%	–6.06	<.001

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Table 3. Tic pain frequency and severity by sex

Pain Measure	Male, n (%)	Female, n (%)	Difference in Proportions	z Score	p Value
Pain Frequency	*n=345*	*n=171*			
Never	76 (22.0%)	23 (13.5%)	+8.5%	–2.19	.029
Rarely	64 (18.6%)	31 (18.1%)	+0.5%	–0.12	.905
Sometimes	128 (37.1%)	59 (34.5%)	+2.6%	–0.49	.622
Often	61 (17.7%)	47 (27.5%)	–9.8%	2.73	.006
Always	16 (4.6%)	11 (6.4%)	–1.8%	0.98	.326
Pain Measure	**Male, n (%)**	**Female, n (%)**	**Difference in Proportions**	**z Score**	**p Value**
Pain Severity	*n=333*	*n=167*			
0 (no pain)	82 (24.6%)	22 (13.2%)	+11.4%	–3.20	.001
1	11 (3.3%)	11 (6.6%)	–3.3%	1.54	.123
2	26 (7.8%)	11 (6.6%)	+1.2%	–0.41	.681
3	45 (13.5%)	28 (16.8%)	–3.3%	0.98	.327
4	38 (11.4%)	24 (14.4%)	–3.0%	0.96	.337
5	62 (18.6%)	18 (10.8%)	+7.8%	–2.40	.016
6	22 (6.6%)	19 (11.4%)	–4.8%	1.94	.053
7	25 (7.5%)	19 (11.4%)	–3.9%	1.36	.173
8	17 (5.1%)	13 (7.8%)	–2.7%	1.07	.284
9	5 (1.5%)	2 (1.2%)	+0.3%	–0.27	.786
10 (worst pain)	0 (0.0%)	0 (0.0%)	—	—	—

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Table 4. Self-harm, suicidal ideation, and suicide attempts by sex

Measure	Male, n/N (%)	Female, n/N (%)	Difference in Proportions	z Score	p Value (z score)	Pearson χ^2 (df=1)	p Value (chi square)
Self-harm Ideation (Lifetime)	126/358 (35.2%)	80/173 (46.2%)	–11.0%	–2.45	.014	5.995	.014
Self-harm Attempt (Lifetime)	92/358 (25.7%)	71/172 (41.3%)	–15.6%	–3.64	<.001	13.244	<.001
Suicide Ideation (Recent)	41/356 (11.5%)	39/173 (22.5%)	–11.0%	–3.32	<.001	11.028	<.001
Suicide Ideation (Prior)	61/339 (18.0%)	50/162 (30.9%)	–12.9%	–3.25	.001	10.528	.001
Suicide Attempt (Recent)	24/360 (6.7%)	19/173 (11.0%)	–4.3%	–1.52	.129	2.935	.087
Suicide Attempt (Prior)	32/349 (9.2%)	28/172 (16.3%)	–7.1%	–2.39	.017	5.716	.017

Table 4. Self-harm, suicidal ideation, and suicide attempts by sex: Caregivers reported whether their child had engaged in self-harm, suicidal ideation, or suicide attempts. "Recent" refers to the past 12 months; "prior" refers to any time before the past 12 months; "lifetime" refers to the child's lifetime up to the present. Suicide attempt questions used categorical response options and were dichotomized for analysis (any attempt vs none). Sex differences were assessed using independent-samples proportions z-tests and Pearson χ^2 tests (df=1).

Tics and Tourette's disorder, Self-Harm, Suicidal Thoughts and Behavior: Differences Between Boys and Girls(2022 TAA Impact Survey)

(Maria Loreta Lopez, MPH, BA; Mary Elizabeth Gorora, MPH, BS; Jessica D. Leuchter, MD; Avi Botwinick, MD; Katrina Hermetet, PhD; Amanda Talty, BA; Philip D Harvey, PhD; Barbara J. Coffey, MD, MS)

Table 5. Treatment inadequacy, self-harm, and suicidal attempt by sex

Measure	Male, n/N (%)	Female, n/N (%)	Difference in Proportions	z Score	p Value (z score)	Pearson χ^2 (df=1)	P Value (chi square)
Self-harm Attempt (Lifetime)	41/137 (29.9%)	41/77 (53.2%)	–23.3%	–3.37	<.001	11.342	<.001
Suicide Attempt (Recent)	6/137 (4.4%)	10/77 (13.0%)	–8.6%	–2.30	.022	5.279	.022
Suicide Attempt (Prior)	11/134 (8.2%)	17/77 (22.1%)	–13.9%	–2.86	.004	8.173	.004

Table 5 – Treatment inadequacy, self-harm, and suicidal attempt by sex: Caregivers were asked whether their child's symptoms were adequately managed by medications or behavioral therapy. Among those reporting inadequate treatment, sex differences were analyzed for lifetime self-harm attempt, recent suicide attempt (past 12 months), and prior suicide attempt (before past 12 months). Sex differences were assessed using Pearson χ^2 tests (df=1), with significant differences observed in all categories. Post hoc independent-samples proportions z-tests indicated higher proportions among females.

Stigma and Risk of Self-injury and Suicidality in Adults with Tourette syndrome: Findings from a Cross-sectional Impact Survey *(TAA Impact Survey 2022)*

(Shiu, C., Arbing, R. H., Piacentini, J., Talty, A., Hermetet, K., & Chen, W. T. (2026). Stigma and risk of self-injury and suicidality in adults with Tourette syndrome: findings from a cross-sectional impact survey. BMJ open, 16(2), e102693. https://doi.org/10.1136/bmjopen-2025-102693)

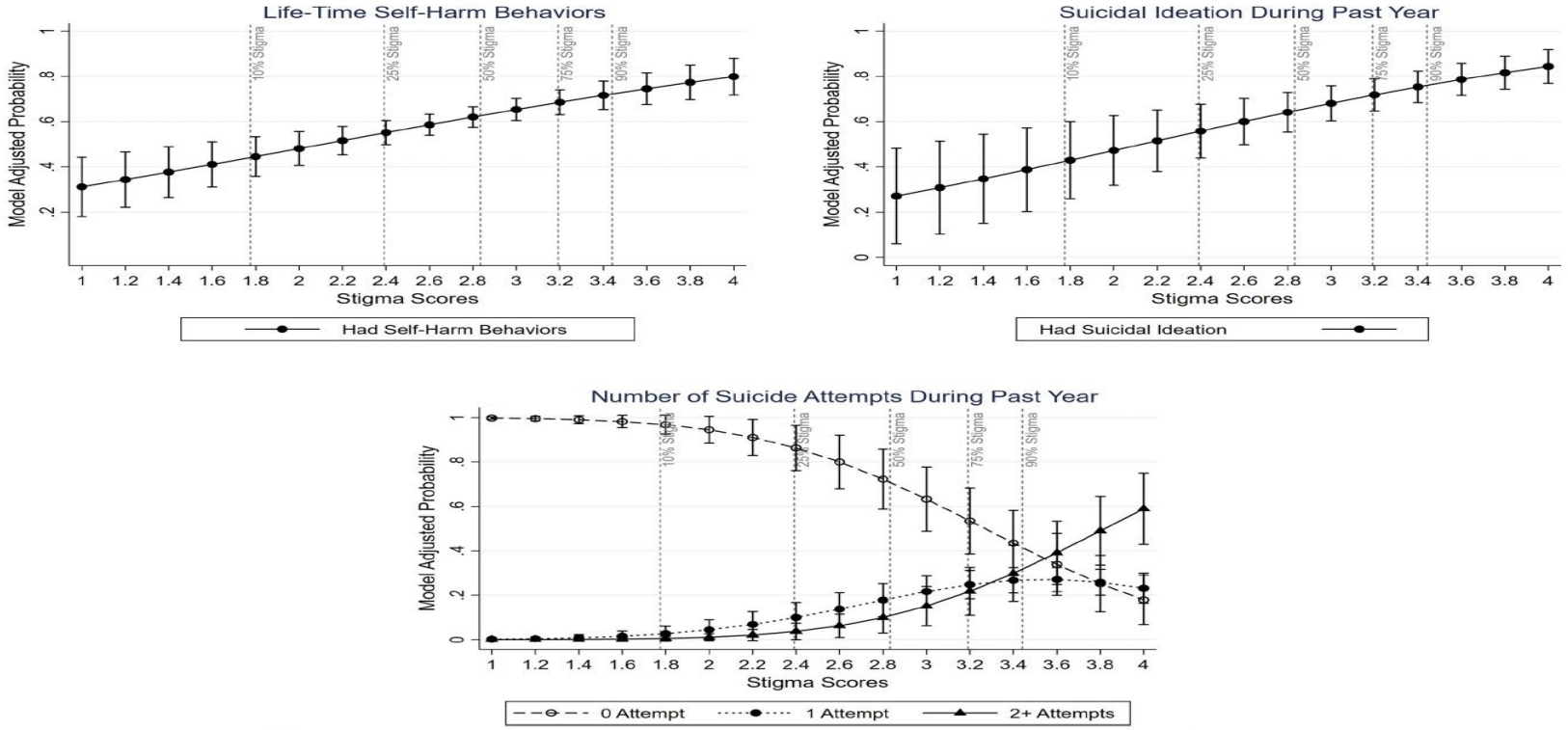

Figure 1 Marginal probabilities of outcomes across stigma levels among adults with Tourette syndrome.

Stigma and Risk of Self-injury and Suicidality in Adults with Tourette syndrome: Findings from a Cross-sectional Impact Survey

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STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study examines the relationship between stigma and self-injury/suicidality in adults with Tourette syndrome.
- ⇒ The inclusion of a large survey sample of people with lived experience of Tourette syndrome is a study strength.
- ⇒ The stigma and outcome measures may contain flaws, potentially weakening the observed associations.
- ⇒ Additionally, despite the use of statistical methods to address missing data on suicidality, data loss remains a concern.

Clinical Summary:
Tourette's Disorder: Tears, Fears…… and Years
Assessment of Risk for Suicidality

1. All individuals with Tourette's disorder and persistent tic disorders in clinical settings should be **screened for suicidal ideation and behavior**, both **current and lifetime**.
2. The **Columbia Suicide Severity Rating Scale (C-SSRS)** is a well- established instrument which can be used for screening.
3. **Level of risk** should be calculated on all patients.
4. **Anxiety and depression** have been shown to mediate the risk for tic severity.
5. **Females may be at greater risk for attempts**, especially in the context of tic related pain and perceived inadequate treatment.
6. **Adults appear to be at significant risk,** especially with more than one attempt and in the context of stigma.
7. For those considered at highest risk, **safety planning is essential.**
8. Aggressive **treatment of mood and anxiety symptoms** is essential, since this may reduce suicidal risk.

Tourette's disorder: Mood and Anxiety Disorders: Treatment Overview

- **Cognitive Behavioral Therapy (CBIT, ERP) and pharmacotherapy** are cornerstone interventions.
- **Mood and/or anxiety symptoms may be causing more distress or impairment than tics** and often need the first intervention.
- Pharmacotherapy is the same as for non-tic patients: **selective serotonin reuptake inhibitors**.
- Doses may need to be adjusted. Some studies have indicated that children with tics treated with SSRIs do not respond as effectively as those without tics.
- Treatment of the **mood and/or anxiety symptoms may improve tic symptoms** secondarily.

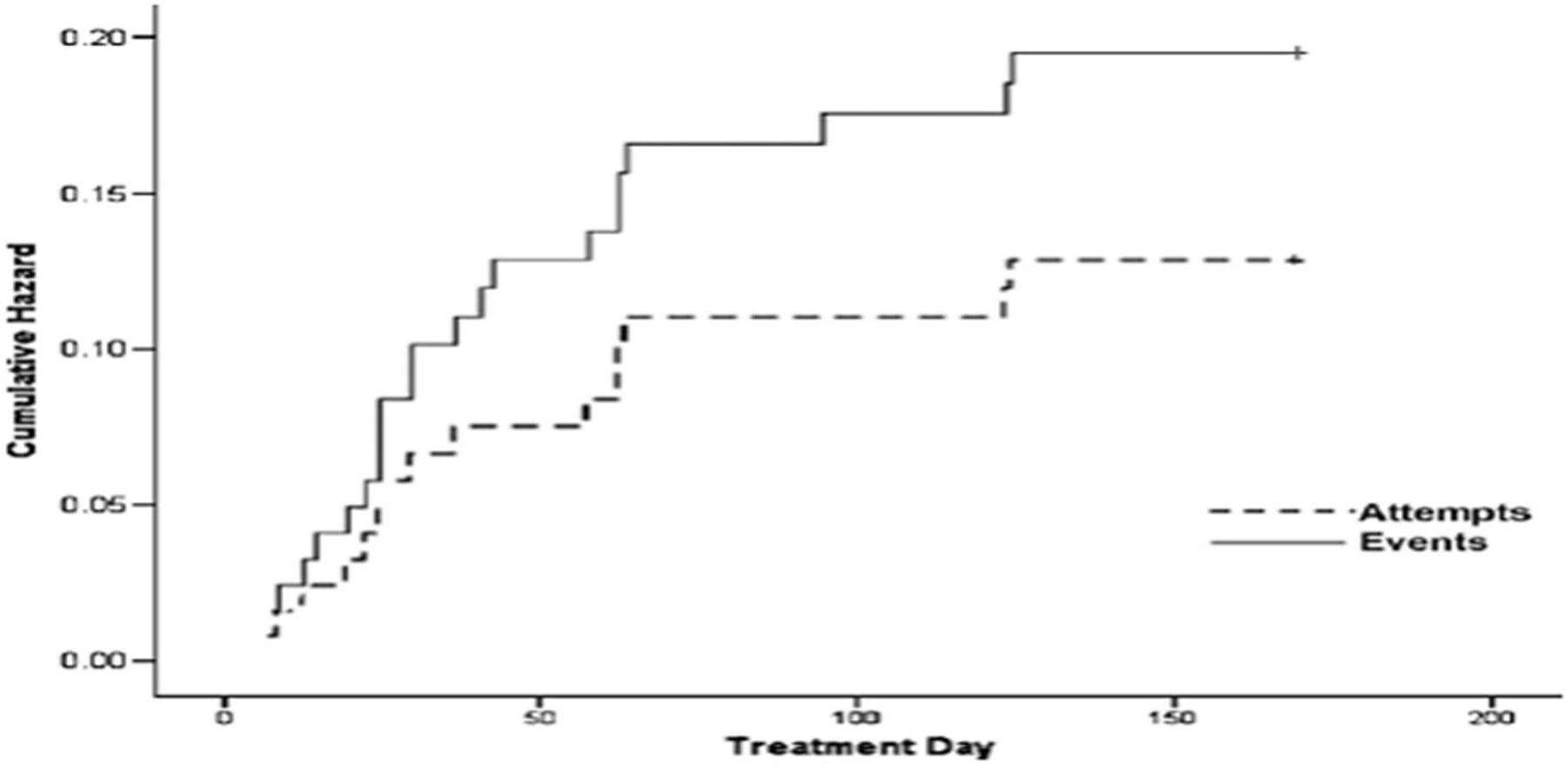

Fig. 2 Time to onset of suicidal events and attempts in TASA. TASA = Treatment of Adolescent Suicide Attempters.

TASA: Predictors of Re-Attempts and New-Onset Suicidal Events

(Brent, D et al; JAACAP; 2009; 48 (10); 987-996)

Suicide Prevention in Youth:
What Is Known About Safety Planning?

(*Carly Albaum et al* ***Safety Planning Interventions for Suicide Prevention in Children and Adolescents: A Systematic Review and Meta-Analysis;*** *JAMA Pediatr. 2025;179(8):886-895 doi:10.1001/jamapediatrics.2025.1012*)

Safety planning is the first step

Safety planning interventions (SPIs) are **brief treatments that aim to prevent or reduce SI and SRB.**

Safety planning, developed as a component of cognitive therapy for suicidal adults, is now used as a stand-alone treatment for adolescents in a variety of contexts.

SPIs incorporate **several key components**:

1) recognizing warning signs or triggers of crisis

2) determining internal and external coping strategies

3) identifying social contacts/settings that provide distraction during crisis

4) recording contact information for professionals, agencies, and local emergency treatment facilities

5) restricting access to lethal means.

Findings: In this systematic review and meta-analysis of the 5 studies that evaluated interventions, **safety planning was not associated with reductions in suicide ideation, suicide-related behavior, suicide attempts, or suicide-related re-presentation** to health care settings (eg, emergency departments; inpatient units) at follow-up. There was moderate to high risk of bias in the included studies.

Meaning: Current evidence to support safety planning as an effective intervention for children and adolescents at increased risk of suicide is limited.

Suicide Prevention in Youth and Adults With Persistent Tic Disorders and Tourette's disorder

We have examined the **prevalence and clinical correlates** of self harm, suicidal ideation, suicide attempts, completed suicide and mortality in persistent tic disorders and Tourette's disorder across the lifespan

Anxiety, depression, and psychiatric comorbidity in are significant risk factors
The good news: We have at least moderately effective interventions for tics and psychiatric comorbid symptoms/disorders.
The bad news: We know very little about best options for intervention for either youth or adults at risk for suicidality

This situation presents some challenges and opportunities……

Tourette's Disorder: Tears, Fears…. and Years

Summary

- **Anxiety (fears) and depression (tears)** have long been described in individuals with persistent tic disorders (PTD) and Tourette's disorder.
- **Anxiety is highly prevalent in youth and adults with PTD and Tourette's;** in youth it is reported to be comparable in severity to that seen in clinically referred youth with anxiety disorders without tics. **Depression** is also reported in a significant minority of individuals with TD. Both are associated with reduced quality of life.
- **Anxiety and depression** may mediate the relationship between tic severity and suicidality.
- Prevalence of **suicidality** in youth and adults with Tourette's disorder is elevated relative to the general population; mortality rates are high.
- **Girls with Tourette's** tend to be diagnosed later in adolescence (**years**) and may have higher rates of suicidal thoughts and behaviors than boys. This may be a result of living longer with tics and comorbid symptoms which could raise the risk of suicidality.
- To date, there are **no specific safety planning or interventional studies** in individuals with persistent tic disorders/Tourette's disorder and suicidality.
- More research is clearly needed; this may be an opportunity for multicenter collaborative research.

Tourette's Disorder: Tears, Fears and Years

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