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BACKGROUND

- From 2020-2022, coinciding with the COVID pandemic, a well documented influx of adolescents presented worldwide with acute onset of functional tic-like behaviors (FTLB)¹
- Increased rates of anxiety, depression, and social isolation, which were prevalent during shutdown, are considered to be driving factors of FTLB²
- FTLB during COVID also correlated with high rates of social media use that created a sense of community for isolated teens, including sites with tic-related content or influencers with FTLB. Many patients’ FTLB mimicked symptoms similar to those seen online, in a phenomenon that came to be known as “TikTok tics”, also called a “pandemic within a pandemic”³⁻⁴

| Classic Tics | Functional Tic-Like Behaviors |
|--|---|
| Present over a longer span of time (1+ years) | Occur in rapid succession over a short span of time |
| Age of onset in early childhood | Age of onset 12 and 18 year old |
| Presence of premonitory urge to tic | Lack of premonitory urge |
| Simple or complex tic-like behaviors that are stereotyped | Multiple varying complex movements like hitting oneself, whistling, lip popping, or repeating random words |

OBJECTIVES

- To better understand the outcomes of FTLB in children
- Describe the percentage of patients that have experienced a resolution of their symptoms since COVID-19 pandemic isolation protocols have been lifted
- Identify comorbidities that may foster a higher risk of developing FTD and determine effective treatments

METHODS

SAMPLE

- 56 children aged 10 to 18 years old seen at BCH psychiatry or neurology outpatient clinics between 08/2020 and 12/2022

INSTRUMENTS

- Clinical Global Impression Improvement Scale (CGI-I) (for FTLB)
- Clinical Global Impression Severity Scale (CGI-S) (overall functioning)

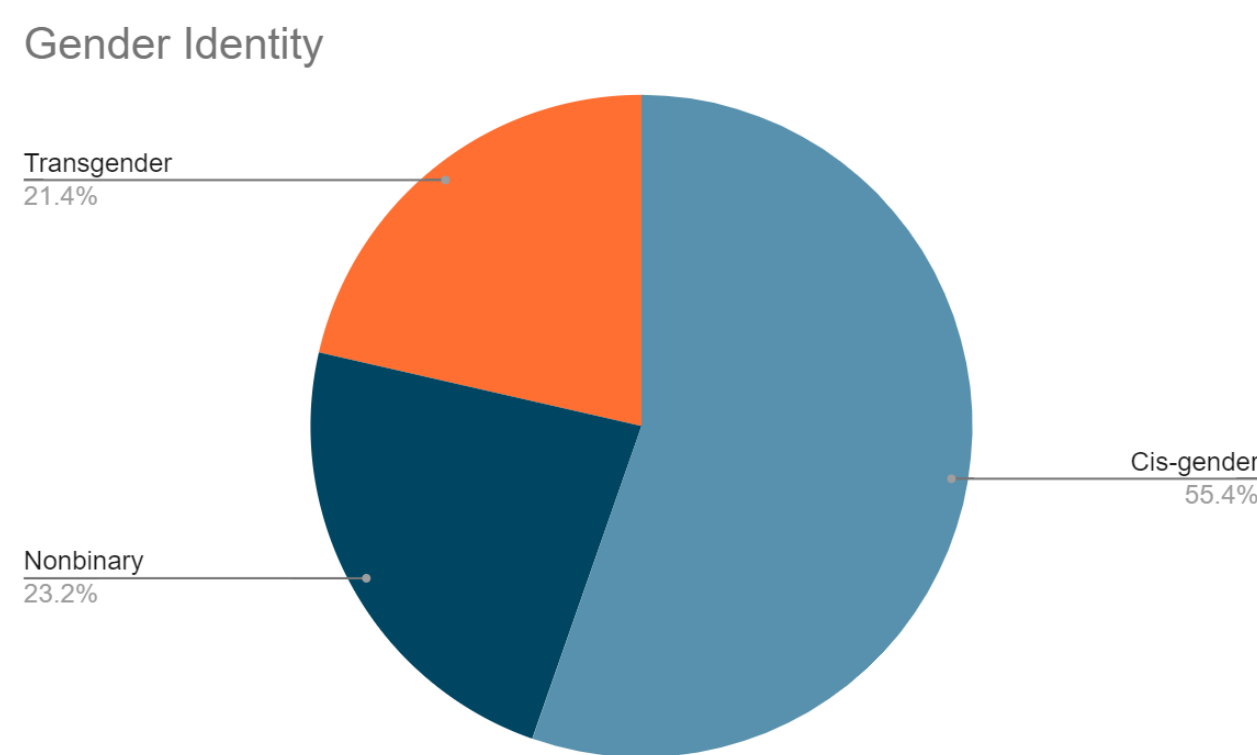
CLINICAL EVALUATION

- A retrospective chart review of pharmacologic treatments (including SSRIs, antipsychotics, alpha agonists), and various behavioral therapies was done along with a review of symptomology

RESULTS

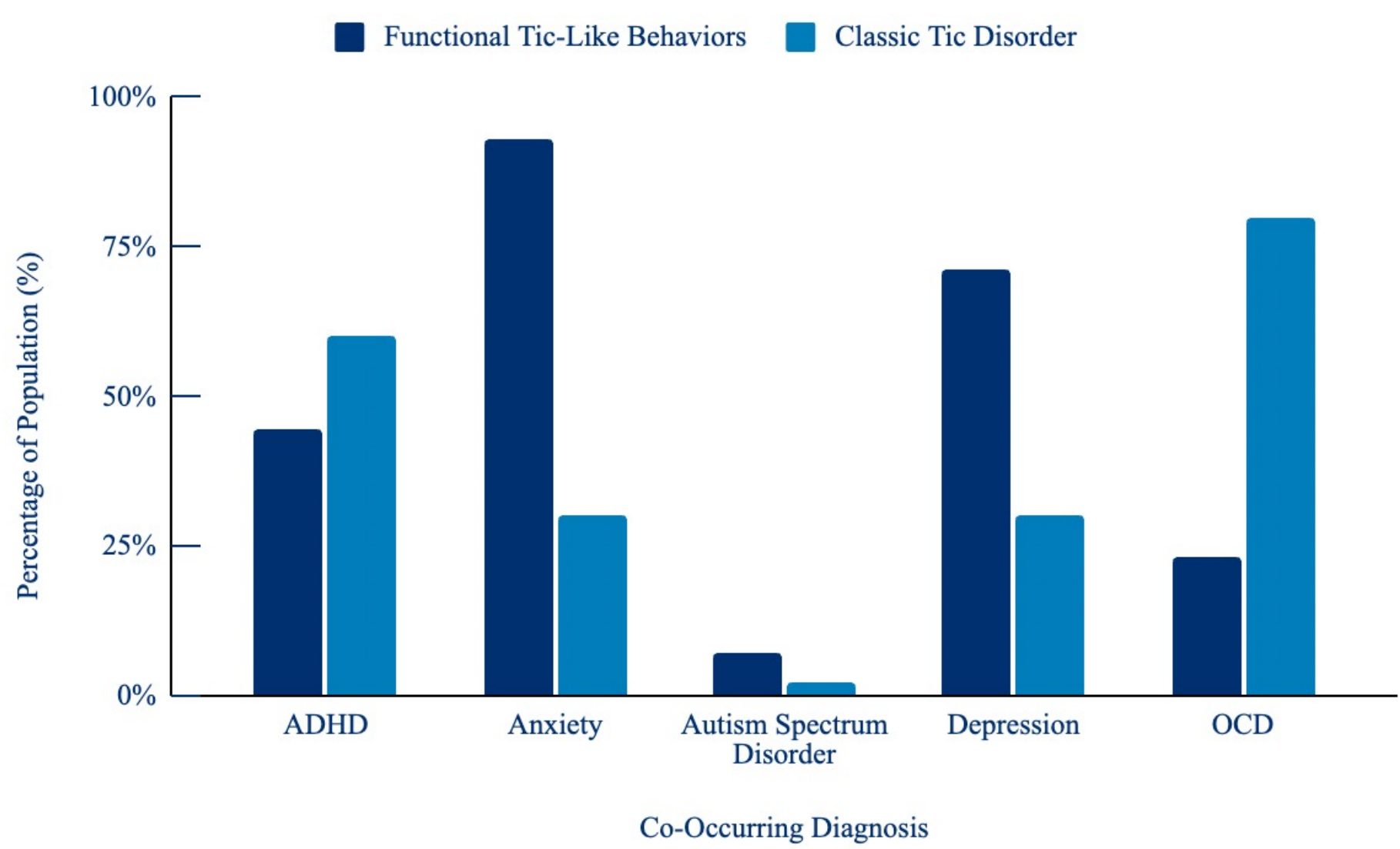
- The majority of patients (96%) were females assigned at birth; 45% identified as gender diverse.
- Typical age of onset was 14 years old, significantly higher than that of classic tic disorders. Fewer than ⅓ of patients (32.1%) had a history of prior tics

Figure 1. Gender diversity in our cohort



- 45% patients had ADHD and 7% had autism. Most patients had preceding mental health struggles, including 93% with anxiety disorders and 71% with depressive disorders.

Figure 2. Comparison between comorbid conditions in FTLB and tics



Compared to adolescents with classic tic disorder, those in our cohort with FTLBs reported having higher rates of co-morbid anxiety (93% vs 30%) and depression (71% vs 30%). Presentation of co-morbid OCD and ADHD, in contrast, is more common in adolescents with classic tic disorders than FTLBs (OCD=80% vs. 23%; ADHD=60% vs. 45%). ASD appears to be slightly more prevalent in those with FTLBs (7% vs 2%), though our number of adolescents with ASD is small, making it difficult to draw reliable comparisons (Zohar 1992, Ogundele, 2018, Freeman, 2000).

- On CGI-I scores, 79% of patients showed improvement in FTLB at follow-up. In terms of overall function, clinicians rated most patients as normal to mildly ill (71.4%) at follow-up; a subset developed other functional neurologic disorders (FND).
- With regard to overall functioning, gender-diverse patients were significantly more likely to be rated as moderately to extremely ill at follow up (P < 0.05). However, while, overall functioning varied differed by gender identity, tic- improvement did not.
- The majority of patients demonstrated improvement in tic-like behaviors at follow up, regardless of gender identity.

Table 1. CGI-I and CGI-S Outcome by gender identity

*P<0.05, ** P<0.01, *** P<0.001.

| | Total # | CGI Improved | Chi-square |
|------------------------------------|---------|--------------|------------|
| CGI-I (Tic Improvement) | | | |
| Cis- Gender | 31 | 26 | 83.9% |
| Gender Diverse | 25 | 18 | 72% |
| CGI-S (Overall Functioning) | | | |
| Ci-s Gender | 31 | 26 | 83.9% |
| Gender Diverse | 25 | 14 | 56% |

- 84% percent of our patients engaged in therapy and medication, and this combined approach yielded the most improvement, regardless of the type of therapy.

Table 2. Treatment Modalities Outcome

Table shows number of subjects improved based on treatment. *P<0.05, ** P<0.01, *** P<0.001

| CGI Outcome | # Subjects | # CGI Improved | % | Chi-square |
|--|------------|----------------|-------|------------|
| Behavioral Therapy | | | | |
| Mental Health Therapy (with CBIT) | 19 | 15 | 78.9% | 6.4* |
| Mental Health Therapy (without CBIT) | 29 | 23 | 79.3% | 10.0** |
| Medications | | | | |
| Mental Health Therapy with No SSRI/SSNRI | 9 | 7 | 77.8% | 4.5* |
| SSRIs/SSNRIs | 46 | 35 | 76.1% | 12.5*** |

CONCLUSION

Discussion:

- Increase in functional tics in adolescents during COVID-19 pandemic resolved for 79% of patients in our cohort.
- Clinical improvement in FTLB was independent of specific comorbidity or gender identity. Over ¾ of patients improved regardless of other diagnoses
- Among those that have not improved there was often a progression to other impairments such as psychogenic non-epileptic seizures (PNES), or eating disorders
- Ongoing FTLB have often been seen in patients who feel validated by this diagnosis and align with active functional tic communities
- Approximately ¾ of patients improved regardless of varying treatment combinations
- Further analysis is required to confirm if specific medication combinations or therapy modalities correlate with improvement in symptoms
- A modified comprehensive behavioral therapy for tics (CBIT) with comprehensive behavioral therapy (CBT) and sensory grounding warrants a development of a modified protocol for patients with FTLB.

Lessons learned:

- Patient’s willingness to engage in therapy and commitment to practicing skills and shifting their mindset away from tics, regardless of the type of therapy seemed essential.
- We learned that social connectivity and spread of ideas among teens via social media has become a powerful, previously underestimated tool and we need to be cautious about future mass sociogenic illnesses.
- Even though for many patients FTLB have improved but anxiety driven illnesses including other FND presentations and eating disorders need to be monitored.
- The future research and recognition of contributing psychosocial factors will allow optimal support for these patients.

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