Clinical characteristics in mass social media-induced illness with functional Tourette-like behavior compared to Tourette syndrome

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**BACKGROUND**

Tourette syndrome (TS) is defined by the DSM-5 as a chronic tic disorder with the presence of:

- at least two motor tics and one vocal tic over a period >12 months in someone under the age of 18 after excluding secondary causes.

Even in combination with the definition for tics as rapid, repetitive, non-rhythmic movements or vocalizations for those, who are unfamiliar with the diagnosis, differentiation from functional Tourette-like behavior (FTB) induced by social media (e.g., mass social media-induced illness, MSMI) is challenging.

Since about 3 years, MSMI-FTB became a global phenomenon presumably spread via numerous influencers on several social media channels including YouTube and TikTok. In Germany, we identified the host of the YouTube channel "Gewitter im Kopf" (English: "Thunderstorm in the brain") as the virtual index person of this outbreak, since patients presenting in our specialized outpatient clinic showed similar or even identical symptoms.

We present clinical characteristics of a relatively large single-center sample of patients with MSMI-FTB compared to a large sample of patients with TS and other chronic tic disorders that may be helpful to differentiate both diseases from each other.

**METHODS**

We prospectively collected a large number of clinical data from patients with MSMI-FTB by using semi-structured clinical and psychological interviews.

Sex differences were examined with respect to age and kind of onset and course of FTB, premonitory sensations, suppressibility, rostro-caudal distribution, distractibility, factors resulting in complete symptom reduction, and absolute numbers of different motor and vocal FTB.

Results were compared to a large sample of patients with primary tic disorders (n=1032 including 529 children, n=235 females) from our center by using t-tests and Fisher’s exact tests. Patients with MSMI-FTB only were compared to patients with MSMI-FTB and comorbid TS using the same statistical tests.

**RESULTS**

**Sample**

- patients with Social Media-induced FTB: n=32
- women: n=16 (50%)
- age: mean=20,1 Jahre, range=11-53 Jahre, median=18 Jahre

**Social Media-induced functional motor (FMB) and vocal behaviors (FVb)**

All patients showed "complex" FMB, but only 19 (59.4%) showed "simple" FMB. A total of 232 different FMB could be recorded, of which 18 were classified as "simple" and 214 as "complex". All patients showed "complex" and 28 (88%) "simple" FVB. In total, we identified 471 different FTB, of which 23 were classified as "simple" and 448 as "complex."

**Clinical Characteristics**

Further clinical characteristics as well as a comparison of these depending on the biological sex (no significant differences) can be found in Table 1.

**Table 1 Clinical characteristics in patients with MSMI-FTB including comparison between males and females**

| Age at onset (years, mean+/−SD) | 19.2+/−11.0 | 7.0+/−3.2 |
| Type of FTB onset (n, %) | Abrupt | Gradual | Abrupt | Gradual | p*<br>| Course of FTB | Fluctuations (n, %) | 23 (71.9%) | 12 (75%) | 11 (68.8%) | 8 (50%) | 0.9+/−1.7 | 5 (15.6%) | 22 (68.8%) | 13 (81.3%) | 0.135 |<br>| Characteristics of FTB | Premonitory sensation (n, %) | 27 (84.4%) | 13 (81.3%) | 14 (87.5%) | 0 | 1.4+/−1.6 | 0.9+/−1.7 | 1.4+/−1.5 | 0.579 |<br>| Suppressibility (n, %) | 27 (84.4%) | 13 (81.3%) | 14 (87.5%) | 0.628 | 2.3+/−1.5 | 2.3+/−1.7 | 0.741 |<br>| Distraction (n, %) | 31 (97.6%) | 16 (100%) | 15 (94%) | 11 (68.8%) | 21.6+/−12.5 | 21.6+/−12.5 | 0.762 |<br>| Rostro-caudal distribution (n, %) | 1 (3%) | 0 (0%) | 1 (6%) | 1 |<br>| Temporary remission (n, %) | 25 (78%) | 12 (75%) | 13 (81%) | 1 |<br>| n of FTB symptoms | Simple motor (mean+/−SD) | 1.4+/−1.6 | 0.9+/−1.7 | 1.4+/−1.5 |<br>| Complex motor (mean+/−SD) | 11.9+/−7.9 | 1.3+/−1.5 | 11.6+/−8.3 | 0.792 |<br>| Simple vocal (mean+/−SD) | 2.3+/−1.6 | 3.3+/−1.5 | 2.3+/−1.7 | 0.473 |<br>| Complex vocal (mean+/−SD) | 18.8+/−13.9 | 21.6+/−16.0 | 26.2+/−11.3 | 0.292 |<br>

**Patients with MSMI-FTB with and without TS**

A comparison of tics in patients with comorbid TS (n=15), in those patients without (n=17) can be found in table 3.

**Most frequent motor symptoms**

- Head movements (n=24, 75%)
- Arm movements (n=20, 63.0%)
- Throwing objects around and food (n=20, 63.0%)
- Middle finger sign (n=17, 53.0%)

**Most frequent vocal symptoms**

- Swearing (n=27, 84.4%)
- Swear words "fuck" (n=20, 62.5%)
- Ass words "ass" (n=15, 46.9%)
- Right wing vocabulary (n=14, 43.8%)
- Words related to food (n=13, 40.6%)

**Patients with MSMI-FTB and with primary tic disorder**

A comparison of clinical characteristics of patients with MSMI-FTB to a large sample of patients with primary tic disorders patients can be found in table 2.

**Table 2 Comparison between patients with social media-induced functional Tourette-like behaviour (FTB) (n=32) and a large sample of patients with chronic tic disorders (CTD) (n=1032)**

| Age at onset (year, mean+/−SD) | 19.2+/−11.0 | 7.0+/−3.2 | <0.001 | <0.001 |
| Most frequent motor symptoms | Head movements (n=24, 75%) | Arm movements (n=20, 63%) | Throwing objects around and food (n=20, 63%) | Middle finger sign (n=17, 53%) |
| Most frequent vocal symptoms | Swearing (n=27, 84.4%) | Swear words "fuck" (n=20, 62.5%) | Ass words "ass" (n=15, 46.9%) | Right wing vocabulary (n=14, 43.8%) | Words related to food (n=13, 40.6%) |

**CONCLUSION**

- We identified several clinical characteristics in patients with MSMI-FTB that allow a clear differentiation including (i) abrupt onset, (ii) rapid deterioration of symptoms, (iii) lack of rostrocaudal distribution, (iv) predominantly complex and vocal symptoms and (v) socially inappropriate behaviors
- No sex differences were found concerning these criteria
- Absolute numbers of complex movements and vocalizations were nine times greater than that of simple movements and vocalizations; that of vocalizations were one and a half times greater than that of movements.
- Kind and duration of premonitory sensations and suppressibility were very different compared to description in patients with TS.
- Significantly higher age at onset, a significantly higher rate of obscene and socially inappropriate symptoms/coprophenomena, and a significantly higher rate of females in comparison to a sample of patients with TS only.
- Significantly higher age at onset of FTB and significantly higher numbers of symptom progression in patients with MSMI-FTB without comorbid TS

2. Zimmermann J. Gewitter im Kopf. 2021; https://www.youtube.com/channel/UCh2Nc3OwjSwuXrUdFNXqFbQ