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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** (= mass social media-induced illness, MSMI[1]) 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"**[2] (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 data from 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) und 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 FVB, of which 23 were classified as "simple" and 448 as "complex."

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

exclaiming of

- swear words "fuck*"/"fuck*" (*n*=20, 62.5%)
- "ass*"/"ass*" (*n*=15, 46.9%)
- right wing vocabulary (*n*=14, 43.8%)
- words related to food (*n*=13, 40.6%)

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

	All (*n*=32)	Male (*n*=16, 50%)	Female (*n*=16, 50%)	*p*[a] (m vs f)
Age at onset (years, mean+/-*SD*)	19.2+/-11.0	16.8+/-9.0	21.6+/-12.5	0.223
Type of FTB onset (*n*, %)				
Abrupt	27 (84.4%)	13 (81.3%)	14 (87.5%)	1
Gradual	5 (15.6%)	3 (18.8%)	2 (12.5%)	1
Course of FTB[b]				
Fluctuations (*n*, %)	23 (71.9%)	12 (75%)	11 (68.8%)	1
Slow progression (*n*, %)	19 (59.4%)	8 (50%)	11 (68.8%)	0.473
Improvement (*n*, %)	21 (65.6%)	8 (50%)	13 (81.3%)	0.135
Characteristics of FTB				
Premonitory sensation (*n*, %)	27 (84.4%)	13 (81.3%)	14 (87.5%)	1
Suppressibility (*n*, %)	27 (84.4%)	13 (81.3%)	14 (87.5%)	0.628
Distractibility (*n*, %)	31 (97%)	16 (100%)	15 (94%)	1
Rostro-caudal distribution (*n*, %)	1 (3%)	0 (0%)	1 (6%)	1
Temporary remission (*n*, %)	25 (78%)	12 (75%)	13 (81%)	1
***n* of FTB symptoms**				
Simple motor (mean+/-*SD*)	1.4+/-1.6	0.9+/-1.7	1.4+/-1.5	0.579
Complex motor (mean+/-*SD*)	11.9+/-7.9	12.3+/-7.6	11.6+/-8.3	0.792
Simple vocal (mean+/-*SD*)	2.2+/-1.6	2.3+/-1.5	2.3+/-1.7	0.741
Complex vocal (mean+/-*SD*)	18.8+/-13.9	21.4+/-16.0	16.2+/-11.3	0.292

a t-tests were performed for interval-scaled dependent variables and Fisher's exact tests for dichotomous dependent variables; b multiple answers possible

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.

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)

	FTB (n=32)	CTD (n=1032)	$p^{a,c}$	$p_c^{b,c}$
Age at onset (year, mean+/-SD)	19.2+/-11.01	7.0+/-3.2	**<0.001**	**<0.001**
Sex ratio (male/female)	1:1	3.4:1	**0.001**	**0.01**
Clinical characteristics				
Premonitory sensation/urge (*n*, %)	27 (84.4%)	700 (67.8%)	0.053	0,53
Suppressibility (*n*, %)	27 (84.4%)	853 (85.4%)	1	1
Obscene and socially inappropriate symptoms/coprophenomena (*n*, %)	31 (96.9%)	290 (28.1%)	**<0.001**	**<0.001**

a uncorrected p-values; b corrected p-values according to Bonferroni; c t-tests were performed for interval-scaled dependent variables and Fisher's exact tests for dichotomous dependent variables

Table 3 Patients with MSMI-FTB with comorbid TS (*n*=15) compared to those without comorbid TS (*n*=17)

	FTB+TS (*n*=15)	FTB (*n*=17)	$p^{b,d}$	$p_c^{c,d}$
Sex (male/female)	9/6	7/10	0.480	1
Age (year, mean+/-*SD*)				
at onset of tics	7.3+/-2.9	NA	NA	NA
at onset of FTB	19.8+/-13.0	18.6+/-9.3	0.762	1
Course of symptoms				
Abrupt onset (*n*, %)	0 (0%)[a]	15 (88.2%)	**<0.001**	**<0.001**
Symptom fluctuations (*n*, %)	15 (100%)[a]	12 (70.6%)	**0.046**	1
Gradual progression (*n*, %)	1 (6.7%)[a]	14 (82.4%)	**<0.001**	**<0.001**
Clinical characteristics of symptoms				
Premonitory sensation (*n*, %)	11 (73.3%)[a]	16 (94.1%)	0.161	1
Suppressibility (*n*, %)	8 (53.3%)[a]	16 (94.1%)	**0.013**	0.325

a refers to tics, all other numbers refer to FTB; b uncorrected *p*-values; c corrected *p*-values according to Bonferroni; d t-tests were performed for interval-scaled dependent variables and Fisher's exact tests for dichotomous dependent variables; significant results are shown in bold

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 gradual symptom progression in patients with MSMI-FTB without comorbid TS

1 Müller-Vahl KR, Pisarenko A, Jakubovski E, Fremer C. Stop that! It's not Tourette's but a new type of mass sociogenic illness. *Brain*. Aug 23 2021.

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