Characteristics of Social Phobia Among Persons With Essential Tremor

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Background: Social phobia symptoms have been reported to be common among patients with essential tremor, but characteristics of this comorbidity have not been systematically described.

Method: Cases with essential tremor (N = 94) and controls without essential tremor (N = 85), ascertained from movement disorder clinic and community samples, were evaluated for social phobia symptoms (using the social phobia module of the Structured Clinical Interview for DSM-IV Axis I Disorders and the Liebowitz Social Anxiety Scale), characteristics of tremor, and associated disability (via videotaped examination, performance test, and disability questionnaire).

Results: Lifetime combined prevalence of primary social phobia and clinically significant social phobia symptoms occurring secondary to essential tremor was 32.7% (16/49) among essential tremor patients in the clinic sample. Essential tremor cases with secondary social phobia symptoms reported a markedly later age at onset of clinically significant social phobia symptoms than essential tremor cases with primary social phobia (51.0 vs. 8.8 years). Cases with secondary social phobia also reported greater fear and avoidance of eating, drinking, and writing in public than essential tremor cases with primary social phobia and control subjects with social phobia. Essential tremor cases with secondary social phobia symptoms also demonstrated more severe tremor and tremor-related disability than essential tremor cases with primary social phobia and essential tremor cases without social phobia. Among all essential tremor cases, severity of social phobia symptoms and tremor independently contributed to disability.

Conclusion: Social phobia appears to occur in a substantial minority of essential tremor patients, and severity of social phobia symptoms is associated with disability, independent of tremor severity. Persons with social phobia symptoms secondary to essential tremor evidence clinical characteristics that differ from those of persons with primary social phobia. Further research is needed to determine the efficacy of treatment of social phobia in essential tremor patients with significant social phobia symptoms.

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Social phobic symptoms of fear of public or social situations are important sequelae of medical conditions with potentially embarrassing physical characteristics, such as tremor, obesity, strabismus, stuttering, and facial scarring.[1–3] Such embarrassing characteristics may be associated with increased fear of negative evaluation and avoidance of social situations, which are sometimes disabling.[4] Despite these commonalities with social phobia, social phobic symptoms limited to concerns about a general medical condition are excluded from a diagnosis of social phobia according to DSM-IV[5] and are currently diagnosed as anxiety disorders not otherwise specified. Reasons for this exclusion put forth by the Social Phobia Workgroup for DSM-IV[3] include (1) lack of data showing that secondary social phobic symptoms have features similar to primary social phobia and (2) lack of data about what constitutes normative levels of social anxiety regarding particular medical conditions.

Essential tremor, characterized by uncontrollable shaking of the hands or head, is a common condition believed to be associated with social anxiety. Its prevalence increases with advancing age to a rate of 1.3% to 5% in those over 60 years of age,[6] making essential tremor one of the most common medical conditions believed to be associated with social anxiety. Clinicians report that their essential tremor patients avoid eating or writing in public because of their tremor and the associated embarrassment.[7] George and Lydiard [2] reviewed the literature on association of essential tremor with anxiety disorders, noting an absence of systematic studies regarding the relationship between social phobia, secondary social phobic

symptoms, and essential tremor. It remains unknown to what extent social phobic symptoms are prevalent in essential tremor and whether such symptoms resemble primary social phobia.

This article examines the prevalence and characteristics of social phobic symptoms among persons with essential tremor, specifically addressing the following issues: How common is social phobia among persons with essential tremor? How do persons with essential tremor and clinically significant secondary social phobic symptoms compare with persons with essential tremor and primary social phobia, with respect to characteristics of their social phobia and their essential tremor?

METHOD

Subjects

Essential tremor cases and control subjects were enrolled in an ongoing study of the functional correlates of essential tremor.[8] Essential tremor cases were ascertained either from an epidemiologic sample of the Washington Heights-Inwood community in northern Manhattan, N.Y., or from a tertiary referral center for patients with involuntary movement disorders in northern Manhattan, N.Y. (Columbia-Presbyterian Medical Center). This dual ascertainment ensured inclusion of essential tremor cases with a broad range of tremor severity, ranging from mild essential tremor (seen in community cases who had not sought medical treatment for tremor) to severe essential tremor (seen in clinic patients).[9]

The community sample was ascertained from 2117 residents aged 65 years or older who were enrolled in a longitudinal study of health in the elderly.[10] Subjects underwent a 90-minute baseline medical interview, and those subjects with neurologic symptoms (cognitive impairment, bradykinesia, or tremor) were referred for baseline and follow-up neurologic evaluations. During the longitudinal neurologic examinations, action tremor was assessed, and 98 subjects were diagnosed as having essential tremor. Upon follow-up of these cases, 49 were either deceased or ineligible due to dementia or other reasons, 6 declined participation, and 43 were enrolled, of whom 39 could be matched to a healthy control subject. Healthy control subjects for the community essential tremor cases were obtained from the same community and matched by age, gender, and ethnicity.

The clinic sample was obtained by first searching for the diagnosis "essential tremor" in the tertiary referral center's computerized database providing demographic and clinical information on all patients evaluated since 1983. This yielded 794 cases from which records were then selected at random and reviewed to exclude cases with accompanying dystonia or Parkinson's disease. Eligible patients were then contacted for enrollment in the current study. Spouses of the clinic patients, when available, were used as healthy control subjects for the clinic sample.[8]

For the present study, all diagnoses of essential tremor were reconfirmed. Essential tremor was defined as kinetic tremor that was of moderate severity when the patient performed at least 3 activities.[8,11] The activities included pouring water, drinking from a cup, using a spoon, finger-to-nose movements, and drawing spirals. All diagnoses were assigned by a neurologist specializing in movement disorders (E.D.L.) based on a review of a videotaped tremor examination in which the above activities were performed.[8,11]

Assessments

Tremor and associated disability. Each subject underwent a videotaped tremor examination[8,11] that included arm extension and the 5 activities noted above (6 activities total using each arm). The videotape was reviewed and tremor was rated from 0 (no tremor) to 3 (severe tremor) by a neurologist specializing in movement disorders (E.D.L.), yielding a total tremor score (range, 0–36). A 15-item performance-based test included the performance of activities that might be impaired by action tremor, including drinking, writing, threading a needle, buttoning buttons, using a key, and using a touch-tone telephone, with observed difficulty performing each item scored by a trained rater from 0 (no difficulty) to 4 (maximum difficulty), and with total score converted to a percentage (100% = maximum difficulty).[12] The trained rater also administered a 36-item tremor disability questionnaire, which assessed the reported functional impact of tremor on activities of daily living, with the score converted to a percentage (100% = maximum reported difficulty).[11] Subjects were also asked if they had been treated for essential tremor and rated change with current treatment on a 7-point scale from "a lot worse" to "a lot better." Treatment responders were defined by having either of the 2 highest ratings: "moderate improvement" or "a lot better."

Psychiatric assessments. Psychiatric measures were completed in a subset of essential tremor cases and control subjects without essential tremor. The social phobia module of the Structured Clinical Interview for DSM-IV Axis I Disorders[13] was administered by a rater who had been trained to reliability by corating subjects with a psychiatrist with expertise in social phobia (F.R.S.). For the purposes of this study, essential tremor cases were assigned a diagnosis of secondary social phobia if social phobia criteria other than criterion H (which excludes social anxiety due to a general medical condition) were met. In this article, the terms *secondary social phobia* and *clinically significant social phobic symptoms secondary to essential tremor* will be used interchangeably.

The same trained rater administered the Liebowitz Social Anxiety Scale (LSAS)[14] to assess severity of social

Table 1. Demographic Features Among Pooled Clinic and Community Subjects With Essential Tremor and Without Essential Tremor

	Essential Tremor Cases (N = 94)		Controls (N = 85)				
Characteristic	N	%	N	%	df	χ^2	p
Female	57	60.6	47	55.3	1	0.52	.47
White	60	63.8	55	64.7	1	0.02	.90
	Mean	SD	Mean	SD		t	
Age, y	70.0	15.7	71.4	12.3	177	0.65	.52
Education, y	13.5	5.1	13.1	4.4	176	0.56	.57

phobia (range, 0–144). For the purpose of assessing social phobia symptoms most likely to be due to tremor, a subscale of the LSAS was developed, utilizing total ratings of fear (0–3) and avoidance (0–3) for each of 3 situations (eating in public, drinking in public, writing in public) that are known to be commonly affected by essential tremor,[6] but are relatively uncommonly affected in persons with primary social phobia[15,16] (range, 0–18).

Among persons with essential tremor who also fulfilled DSM-IV criteria for social phobia (excluding criterion H), the rater asked the subject to assess the relationship of social phobia to essential tremor as (1) social phobia due to essential tremor (appears completely attributable to tremor, chronologically and causally, and does not seem out of proportion to severity of tremor); (2) social phobia out of proportion to essential tremor (appears attributable to tremor, but severity of social phobia is out of proportion to severity of tremor); (3) social phobia partly due to essential tremor (appears to be both independent of and attributable to tremor; e.g., preexisting social phobia worsened due to tremor, separate episodes of social phobia have different relationships to tremor, or a single episode of social phobia has elements related and unrelated to tremor); or (4) social phobia independent of essential tremor (appears to be completely independent of tremor).

The Modified Mini-Mental State Examination (MMSE)[17] was administered to assess cognitive impairment.

Data Analysis and Statistics

Statistical tests included chi-square or Fisher exact test, analysis of variance (ANOVA), logistic and linear regression analyses, and t tests. A significance level of $p < .05$ was used, and all tests were 2-tailed. Pearson correlation coefficient r was used to assess correlations between variables.[18] To test whether cognitive impairment influenced findings, all analyses were repeated excluding subjects with mild or greater cognitive impairment, as indicated by a Modified MMSE[17] score < 50 (equivalent to a Folstein MMSE[19] score < 27). There were no substantive differences from the main analyses.

Table 2. Prevalence of Social Phobia Among Clinic and Community Subjects With and Without Essential Tremor[a]

	Essential Tremor Cases		Controls				
Sample	N	%	N	%	df	χ^2	p
Combined clinic and community	N = 88		N = 84				
Lifetime social phobia	19	21.6	13	15.5	1	1.1	.31
Current social phobia	13	14.8	3	3.6	1	6.4	.01
Clinic	N = 49		N = 45				
Lifetime social phobia	16	32.7	9	20.0	1	1.9	.17
Current social phobia	11	22.4	3	6.7	1	4.6	.03
Community	N = 39		N = 39				
Lifetime social phobia	3	7.7	4	10.3	1	...	1.00
Current social phobia	2	5.1	0	0.0	1	...	.49

[a]Symbol: ... = not applicable; Fisher exact test was performed.

RESULTS

Essential Tremor Case and Control Group Samples

A total of 94 cases with essential tremor and 85 control group subjects without essential tremor were evaluated. The clinic sample consisted of 55 cases with essential tremor and 46 control subjects; the community sample consisted of 39 cases with essential tremor and 39 control subjects. For the pooled clinic and community samples (Table 1) and for each sample separately, cases with essential tremor and subjects without essential tremor did not differ in age, gender, race, or education. Six cases and 1 control subject were excluded from further analyses due to absence of psychiatric data.

Prevalences of Lifetime and Current Social Phobia

Lifetime social phobia (primary or secondary) was highly prevalent among essential tremor cases overall (19/88, 21.6%) and among essential tremor cases within the clinic sample (16/49, 32.7%), although not significantly more prevalent than in the respective groups without essential tremor (Table 2). Current social phobia was significantly more prevalent among essential tremor cases overall and within the clinic sample than in the respective groups without essential tremor.

Primary and Secondary Social Phobia Among Essential Tremor Subjects

Among essential tremor cases with data available for age at onset of social phobia and essential tremor (N = 84), social phobia was primary (onset prior to the onset of essential tremor) in 11 cases (13.1%), secondary (onset after the onset of essential tremor) in 8 cases (9.5%), and absent in 65 cases (77.4%). The primary social phobia group was younger and had completed more

Table 3. Comparison of Essential Tremor (ET) Patient Subgroups With and Without Social Phobia (SP)*

Variable	ET and Primary SP (N = 11) N	%	ET and Secondary SP (N = 8) N	%	ET Without SP (N = 65) N	%	df	F	p
Female	7	63.6	5	62.5	39	60.0	2	...	1.00
White	9	81.8	7	87.5	41	63.1	2	...	.29
	Mean	SD	Mean	SD	Mean	SD			
Age, y	56.4	19.8	71.0	10.6	72.1	15.4	83	4.73	.011[a]
Education, y	17.6	5.4	14.3	4.4	13.3	5.2	82	5.37	.006[b]
Age at onset of social phobia, y	8.8	5.3	51.0	21.8	NA	NA	6.5	5.04	.002
Age at onset of tremor, y	42.0	17.7	33.1	23.1	52.6	24.5	74	2.90	.061[c]
TTS	15.4	7.6	28.5	4.8	19.3	7.3	81	8.05	.001[d]
TDQ	34.1	23.4	65.3	21.5	39.2	28.9	82	3.56	.033[e]
Performance-based test	16.4	19.1	44.1	20.4	22.0	18.9	83	5.68	.005[f]

*Abbreviations: NA = not applicable, TDQ = tremor disability questionnaire, TTS = total tremor score. Symbol: ... = not applicable; Fisher exact test was performed.
[a]Age, y, pairwise comparisons: primary SP vs. secondary SP, t = 1.90, df = 17, p = .075; primary SP vs. ET without SP, t = 2.99, df = 74, p = .004; secondary SP vs. ET without SP, t = 0.19, df = 71, p = .85.
[b]Education, y, pairwise comparisons: primary SP vs. secondary SP, t = 1.46, df = 17, p = .16; primary SP vs. ET without SP, t = 3.20, df = 73, p = .002; secondary SP vs. ET without SP, t = 0.98, df = 70, p = .33.
[c]Age at onset tremor, y, pairwise comparisons: primary SP vs. secondary SP, t = 0.93, df = 16, p = .37; primary SP vs. ET without SP, t = 1.30, df = 65, p = .20; secondary SP vs. ET without SP, t = 2.12, df = 63, p = .038.
[d]TTS, pairwise comparisons: primary SP vs. secondary SP, t = 4.24, df = 16, p = .001; primary SP vs. ET without SP, t = 1.55, df = 72, p = .13; secondary SP vs. ET without SP, t = 3.49, df = 70, p = .001.
[e]TDQ, pairwise comparisons: primary SP vs. secondary SP, t = 2.96, df = 17, p = .009; primary SP vs. ET without SP, t = 0.55, df = 73, p = .58; secondary SP vs. ET without SP, t = 2.46, df = 70, p = .016.
[f]Performance-based test, pairwise comparisons: primary SP vs. secondary SP, t = 3.05, df = 17, p = .007; primary SP vs. ET without SP, t = 0.92, df = 74, p = .36; secondary SP vs. ET without SP, t = 3.10, df = 71, p = .003.

years of education. Mean age at onset of social phobia was much lower in the primary social phobia group than in the secondary social phobia group (Table 3).

Among essential tremor cases with primary social phobia (N = 11), 9 (81.8%) reported their social phobia to be independent of essential tremor, 1 reported that social phobia was partially due to essential tremor, 1 reported that the social phobia was due to essential tremor but out of proportion to essential tremor severity, and none attributed their social phobia completely to their tremor. Among essential tremor cases with secondary social phobia (N = 8), 5 (62.5%) attributed their social phobia completely to their tremor, 1 reported that the social phobia was due to essential tremor but out of proportion to essential tremor severity, 2 reported that social phobia was partially due to essential tremor, and none reported their social phobia to be independent of essential tremor.

Qualities of social phobia were assessed among the 15 subjects with current social phobia (secondary social phobia, N = 6; primary social phobia, N = 6; social phobia without essential tremor, N = 3), excluding 1 subject with incomplete data. Fear and avoidance of eating, drinking, and writing in public, as measured by mean LSAS eating/drinking/writing subscores, was greater in the secondary social phobia group (9.8 ± 4.6) than in the primary social phobia group (1.7 ± 1.4); fear and avoidance in the primary social phobia group was similar to that of subjects with social phobia in the control group (2.7 ± 3.1; overall, $F = 9.92$, df = 14, $p = .003$; pairwise, secondary social phobia > primary social phobia, $p = .004$, secondary social phobia > social phobia without essential tremor, $p = .032$; primary social phobia not significantly different from social phobia without essential tremor, $p = 1.0$). Social phobia severity (mean LSAS total score) did not differ significantly between groups (secondary social phobia group, 46.4 ± 34.3; primary social phobia group, 36.7 ± 17.8; social phobia without essential tremor control group, 21.3 ± 11.0; $F = 0.98$, df = 14, $p = .40$).

Relationship of Essential Tremor Characteristics and Disability to Social Phobia

As shown in Table 3, cases with secondary social phobia had more severe tremor (total tremor score) than did cases with primary social phobia and cases with essential tremor but without social phobia. Cases with secondary social phobia also reported earlier age at onset of tremor compared with that of cases with essential tremor but without social phobia. However, when tremor severity and age at onset of tremor were entered into a logistic regression model to predict group membership (secondary social phobia vs. essential tremor without social phobia), only tremor severity continued to demonstrate an independent association with secondary social phobia ($p = .015$). Latency from onset of essential tremor to development of secondary social phobia ranged from 1 year to 49 years.

Secondary social phobia was also associated with increased self-reported and observed tremor-related disability on the tremor disability questionnaire and performance-based test, respectively (see Table 3). Among all cases with essential tremor, current severity of social phobia (LSAS) correlated significantly with self-reported disabil-

ity (tremor disability questionnaire) ($r = 0.34$, $p = .001$) and with observed disability (performance-based test) ($r = 0.26$, $p = .011$), although not with observed severity of tremor (total tremor score) ($r = 0.16$, $p = .14$). A linear regression model demonstrated that both social phobia severity and tremor severity were independently associated with self-reported disability ($\beta = 0.28$, $p = .001$ and $\beta = 0.54$, $p < .001$, respectively) and with observed tremor-related disability ($\beta = 0.17$, $p = .025$, and $\beta = 0.69$, $p < .001$, respectively). At the time of testing, rates of moderate or greater response of essential tremor to treatment were low (3/11, 27.3% for essential tremor and primary social phobia; 3/8, 37.5% for essential tremor and secondary social phobia; and 10/65, 15.4% for essential tremor without social phobia) and did not significantly differ between groups.

DISCUSSION

These findings demonstrate that social phobia does not inevitably accompany the potentially embarrassing tremor of essential tremor. Most cases with essential tremor did not report the marked distress or significant functional impairment specifically related to fears of embarrassment or humiliation required for a diagnosis of social phobia. When comorbid social phobia is present, however, it has clinical significance that suggests such patients may benefit from specific therapeutic intervention. Among comorbid cases, all of those with primary social phobia and about half with secondary social phobia reported that their social phobia was either unrelated to or out of proportion to their tremor. Both tremor severity and social phobia symptom severity independently contributed to disability in essential tremor cases.

Persons with comorbid essential tremor and social phobia differ in a variety of ways from persons with either diagnosis alone, and this difference is most pronounced for persons with social phobia symptoms occurring secondary to essential tremor. Subjects with secondary social phobia reported a markedly later age at onset of social phobia (mean = 51 years) than subjects with primary social phobia (mean = 9 years), reflecting the age at onset of the primary diagnosis of essential tremor (mean = 33 years) in this comorbid subgroup. The late age at social phobia onset distinguishes the secondary social phobia group from social phobia in the general population, in whom onset after 30 years of age is uncommon.[20] Consistent with the secondary social phobia cases' attribution of their social phobia symptoms at least partially to their tremor, they reported more fear and avoidance of situations relatively specifically affected by tremor (eating, drinking, and writing in public) than did subjects with primary social phobia or social phobia without essential tremor. Cases with secondary social phobia also had more severe tremor and tremor-related functional impairment in comparison to that of cases with primary social phobia or essential tremor alone.

These differences between primary social phobia and social phobia secondary to essential tremor have heuristic and clinical implications. As has been suggested for other embarrassing disorders comorbid with social phobia, such as stuttering,[4,21] independent risk factors for essential tremor and social phobia may interact in different ways, consistent with a stress-diathesis model of social phobia. In this model, primary social phobia is characterized by having a strong predisposition to social phobia symptoms that are initially independent of essential tremor and continue partially independent of essential tremor throughout its course. Cases of secondary social phobia are characterized by a weaker predisposition to social phobia, which is only expressed clinically after the onset of essential tremor, is influenced by tremor severity, and is problematic in situations in which the tremor becomes evident to others. The modest rate of secondary social phobia among essential tremor cases (9.5%) is consistent with evidence that direct conditioning experiences are reported by only a minority of persons with social phobia.[22] Although patients with either form of comorbid social phobia and essential tremor may benefit most from treatment of both conditions, secondary social phobia would be likely to show more benefit from successful treatment of the essential tremor, and primary social phobia would be likely to require specific intervention directed at social phobia.

With respect to diagnosis, the distinctive features of social phobia in persons with social phobia secondary to essential tremor suggest that lumping such secondary social phobia with primary social phobia in descriptive studies could potentially distort description of the clinical characteristics of primary social phobia. Continued exclusion of secondary social phobia from the DSM diagnostic category of social phobia, however, may impede recognition of secondary social anxiety syndromes that might respond best to combined treatment of the primary condition and treatment of social phobia. Treatment of social phobia has been suggested to be helpful for social anxiety secondary to stuttering and a variety of other conditions.[1,21] Among essential tremor patients, tremor exacerbations related to anxiety and stress may respond to treatment with β-blockers[23] and benzodiazepines,[24] both of which are also treatments for social phobia.

Although rates of lifetime social phobia did not differ between essential tremor cases and control subjects, the prevalences of lifetime social phobia among clinic essential tremor cases (32.7%) and clinic controls (20.0%) were both unusually high. The 10.3% lifetime prevalence of social phobia in the community sample overall is more consistent with prevalences of up to 13.3% reported in other U.S. community samples.[25] (Our samples included older subjects than those in many community samples, but this would be most likely to deflate the observed rate

of social phobia, since community studies have reported rates of social phobia in the elderly to be comparable[26] or lower [20] than those in younger adults.) The expected prevalence that was found in the community sample suggests that the high clinic prevalence does not reflect a systematic overdiagnosis of social phobia in this study.

A clinic essential tremor sample, and especially the small minority of essential tremor cases who seek treatment at a specialty clinic, might be expected to have more social phobia than community essential tremor cases due to the clinical severity of their tremor leading to excess secondary social phobia. Excluding cases of social phobia secondary to essential tremor would decrease the prevalence of social phobia among clinic essential tremor patients in our sample from 32.7% to 18.4%, but cannot explain the high 20.0% prevalence of social phobia among clinic control subjects, who were mostly spouses of essential tremor patients. It is conceivable that some excess of social phobia among spouses of essential tremor patients might be due to assortative mating effects of socially sensitive spouses marrying patients who had early onset of essential tremor, or perhaps spouses of essential tremor patients vicariously become sensitized or are more likely to recall and report their own past or current experiences with social anxiety.

Our findings are limited by the small subsamples of cases with primary and secondary social phobia. Another limitation is that the diagnostic assessment for social phobia could not be performed blind to the diagnosis of essential tremor, although there is no evidence that results were systematically biased by this. The assessment of disability was focused on limitations in motor activities such as pouring liquids and did not include detailed assessment of higher order impairments such as occupational and social functioning that have been reported in patients with social phobia.

These findings suggest that social phobia is present in a substantial minority of essential tremor patients. Social phobia symptoms are associated with greater functional impairment, and they vary in temporal relationship to the onset of essential tremor. Future studies should address the treatment of secondary social phobia symptoms and disability in essential tremor and other disorders with embarrassing physical symptoms to determine the efficacy of treatments known to benefit social phobia patients.

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