Clinical Correlates of Tourette's Disorder Across Cultures: A Comparative Study Between the United Arab Emirates and the United Kingdom

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Background and Objective: Tourette's disorder is a neuropsychiatric disorder characterized by motor and vocal (phonic) tics. While the disorder has been researched extensively in the Western populations, the clinical correlates and associated features are less well known in other populations and cultures. This study examines the presentation and clinical correlates of Tourette's disorder in 2 distinct populations, namely the United Kingdom and the United Arab Emirates.

Method: A consecutive series of 35 Tourette's disorder patients of Arab descent recruited from 2001 to 2005 from the Child Psychiatry clinics in Al Ain, United Arab Emirates (U.A.E.), were compared with 35 age- and gender-matched white Tourette's disorder patients attending the Tourette Clinic at the National Hospital for Neurology and Neurosurgery, Queen Square, London, United Kingdom, from December 2004 to December 2005.

Results: Rates of occurrence of obsessive-compulsive disorder and attention-deficit/hyperactivity disorder were similar in the 2 cohorts. Coprolalia was higher in the U.K. cohort and was noted to correlate with the severity of Tourette's disorder. Comorbid oppositional defiant disorder and conduct disorder were also higher in the U.K. cohort (54.3% [N = 19] and 20.0% [N = 7], respectively) as compared to the U.A.E. cohort (11.4% [N = 4] and 5.7% [N = 2], respectively) but were not linked to any other clinical feature or severity of Tourette's disorder.

Conclusion: The findings illustrate the similarity in the core clinical symptoms between the 2 populations, thus emphasizing the underlying biological and genetic basis of these symptoms. However, our finding of higher occurrence of behavioral symptoms in the Western sample has implications for our understanding of the phenotypic presentation of Tourette's disorder as well as the management.

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Tourette's disorder, characterized by multiple motor tics and 1 or more vocal/phonic tics,[1,2] is associated with a number of comorbid conditions and psychopathologies.[3] An international investigation suggested that only 12% of clinic Tourette's disorder patients had no psychopathology.[4] This has also been demonstrated to be true in epidemiologic settings, with only 8% of Tourette's disorder youngsters in the community not having psychopathology.[5] In this regard, a number of associated features have been described, and the most notable of these are obsessive-compulsive behavior or disorder and attention-deficit/hyperactivity disorder (ADHD), as well as self-injurious behaviors, sleep disturbances, aggression, anxiety, and depression.[6]

Studies examining the clinical features of Tourette's disorder from North America and Europe have consistently shown that the disorder is more common in males, with a male to female ratio of 3:1 or 4:1 and a mean age at onset of 7 years (range, 2–15 years).[7,8] The most common initial symptom involves the eyes, face, or head, progressing to the shoulders, trunk, and extremities. The vocal tics usually have a later age at onset than motor tics, with a mean age at onset of 11 years. These authors also noted that 30% to 60% of patients develop coprolalia and 10% to 40% develop echolalia.[7,8]

In an International Registry of 430 case reports compiled by Abuzzahab and Anderson[9] consisting mainly of North American and European populations, 71% of the sample was found to be male, with an age at onset between 5 and 10 years. According to this Registry, the most common motor tics involved the face (92%),

followed by the arms (78%), and vocal symptoms included inarticulate utterances (65%), coprolalia (58%), and echolalia (23%). Obsessive-compulsive disorder was observed to be the most common comorbidity. Some cross-cultural symptom differences were also noted by these authors, with fewer eye and neck tics and more echokinesis in France, less echophenomena in the United Kingdom, more eye tics in Italy, and more neck tics and coprolalia in the United States, but other subsequent independent studies on separate Tourette's disorder cohorts have failed to replicate these findings.[10,11]

Although studies have suggested that the disorder occurs worldwide and that the symptoms are similar across cultures, [12–15] there is also some evidence to suggest there may be some variations in the presentation, especially with regard to associated features. For example, a study from Korea observed fewer obsessive-compulsive symptoms or behavioral problems as compared to the Western population,[16] while a greater male preponderance and lower rates of coprolalia were noted by Japanese investigators.[17] The presence of coprolalia has shown considerable variation across cultures, with rates as low as 4% to 11% in Japan,[18,19] to 46% in New Zealand[20] and 60% in Hong Kong.[21] In addition, the lower rates of coprolalia observed among the middle class and those from strict religious backgrounds[22] as well as a case report from China that reported the vocalization of a young girl that translated as "down with Chou En-lai"[23] have led to the suggestion that some of these features with social connotation may be modified by cultural and psychosocial factors. On the other hand, a high rate of 74% for coprolalia reported from cross-cultural case reports[8] and 70% from another Japanese cohort[24] may be indicative of the differences in sample selection and diagnostic criteria used by different authors.

A review of Tourette's disorder symptoms and associated features by Staley et al.[8] reported 39 cases from cross-cultural sources and concluded that the patterns observed in North American and European samples are similar to those from other regions and cultures around the world. However, minor differences were also noted, including the fact that the percentages of males in Eastern and Asian samples exceeded those found in Western studies.[18,25] This may be attributed at least in part to the sample selection methods or help-seeking patterns of patients in certain cultures in which females are more reluctant than males to seek help. In addition, the methodological differences in the diagnostic criteria as well as the instruments used to ascertain associated features would mean that the differences observed need not necessarily be a true reflection of the situation. The present study was therefore conducted using the same diagnostic and standardized published assessment methods to examine the similarities and differences between an Arab clinic cohort and a white U.K. clinic cohort.

Table 1. Clinical Characteristics of Tourette's Disorder Patients in the Current Study Compared to Worldwide Data

Characteristic	United Kingdom (N = 35)	United Arab Emirates (N = 35)	Worldwide[a]
Male-female ratio	2.9:1	2.5:1	3:1
Age at onset, mean, y	6.0	6.4	7.2
	N (%)	N (%)	%
First tic: eye or face	18 (51.4)	20 (57.1)	NA
Facial tics	35 (100)	35 (100)	91
Limb tics	31 (88)	25 (72)	78
Complex motor tics	5 (14.3)	3 (8.6)	68
Coprolalia	9 (25.7)	3 (8.6)	10–30
Copropraxia	4 (11.4)	1 (2.9)	2–21
Echolalia	15 (42.9)	13 (37.1)	20–45
Self-injurious behavior	10 (28.6)	6 (17.1)	NA
Aggression	7 (20.0)	1 (2.9)	NA
Obsessive-compulsive behavior	15 (42.9)	13 (37.1)	28–50
ADHD symptoms	21 (60.0)	24 (68.6)	35–65
Oppositional defiant disorder	19 (54.3)	4 (11.4)	NA
Conduct disorder	7 (20.0)	2 (5.7)	NA

[a]Data from Bruun.[29]
Abbreviations: ADHD = attention-deficit/hyperactivity disorder, NA = not applicable.

METHOD

Consecutive patients of Arab descent who met the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision (DSM-IV-TR) criteria for Tourette's disorder were recruited from the Child Psychiatry clinics at Al Ain, United Arab Emirates (U.A.E.), during a 5-year period from 2001 to 2005, with a 100% participation rate. The same number of age-matched white subjects were then selected from a consecutive list of patients attending the Tourette Clinic at the National Hospital for Neurology and Neurosurgery, Queen Square, London, United Kingdom, for the period December 2004 to December 2005. Ethical permission was given by both institutions, and all parents gave written informed consent. All of the patients were assessed using the National Hospital Interview Schedule [26] for the assessment of Tourette's disorder and associated behaviors, which includes detailed assessment of personal and family histories and demographic details. The Yale Global Tic Severity Scale (YGTSS)[27] and the Diagnostic Confidence Index (DCI)[28] were also completed. Demography, family history, clinical features, severity, and comorbid conditions were compared in the 2 samples.

RESULTS

The clinical characteristics of the 2 samples are detailed in Table 1. The U.A.E. sample consisted of 25 males and 10 females, while the U.K. sample consisted of 26 males and 9 females. Thus, the male to female ratio was similar at 2.9:1 for the U.K. sample and 2.5:1 for the

U.A.E. sample. Patient ages ranged from 5 to 17 years, and the mean age at onset was 6.0 years for the U.K. cohort and 6.4 years for the U.A.E. cohort. The most common first tic was eye blinking in both samples. In the U.K. sample, 51% reported tics involving the eye or face as the first tic, while, in the U.A.E. cohort, this constituted 57% of the sample. Of the 35 patients from the United Kingdom, 13 (37.1%) had received the diagnosis of Tourette's disorder prior to coming to the Tourette clinic, while, in the U.A.E. sample, only 4 (11.4%) had received the diagnosis earlier. Family history was positive for Tourette's disorder and tics in 31% of the U.K. cohort (N = 11) as compared to 17% in the U.A.E. cohort (N = 6).

The severity scores assessed using the YGTSS were as follows. The mean YGTSS score was 35.3 (range, 8–84) for the U.K. cohort, while that for the U.A.E. cohort was 12.8 (range, 2–64). The DCI scores, indicative of lifetime cumulative symptomatology, ranged from 24% to 100% (mean score = 66%) for the U.K. cohort, while those for the U.A.E. cohort were 12% to 88% (mean score = 46%). Subjective distress and impairment in functioning were reported by 33 of 35 U.K. patients (94.3%) as compared to 22 of 35 U.A.E. patients (62.9%).

Coprolalia was found in 25.7% of the U.K. sample (N = 9) as compared to 8.6% of the U.A.E. sample (N = 3), while the rates for copropraxia were 11.4% (N = 4) and 2.9% (N = 1), respectively. In addition, coprolalia was found to be associated with the severity of Tourette's disorder, as indicated by the YGTSS score (p = .002) in the U.K. sample. Among the U.K. patients, 42.9% (N = 15) had echolalia, and, in the U.A.E. sample, 37.1% (N = 13) had echolalia. The rates for self-injurious behavior were 28.6% (N = 10) and 17.1% (N = 6), respectively, for the U.K. and U.A.E. cohorts. The rate of aggression was found to be higher in the U.K. patients than in the U.A.E. patients (20.0% [N = 7] and 2.9% [N = 1], respectively).

Fifteen patients (42.9%) had obsessive-compulsive behavior and 21 patients (60.0%) had ADHD symptoms in the U.K. cohort, while 13 patients (37.1%) had obsessive-compulsive behavior and 24 patients (68.6%) had symptoms of ADHD in the U.A.E. cohort (p = .231 and p = .110, respectively). A comorbid diagnosis of oppositional defiant disorder was found in 19 patients (54.3%) in the U.K. sample and 4 patients (11.4%) in the U.A.E. sample, while conduct disorder was observed in 7 patients (20.0%) in the U.K. cohort and 2 patients (5.7%) in the U.A.E. cohort. The rate of disruptive behaviors and oppositional defiant disorder was significantly higher in the U.K. sample as compared to the U.A.E. sample (p = .004).

DISCUSSION

To the best of our knowledge, this study is the first direct comparison of age- and sex-matched patients with Tourette's disorder from 2 different cultures, using identical standardized assessment schedules.

Our finding of a strikingly similar pattern of clinical characteristics between this white sample from the United Kingdom and the Arab sample from the United Arab Emirates is in keeping with the observation of other investigators about a consistent pattern across cultures.[8,9,29,30] In this regard, the male preponderance as well as the mean age at onset of around 6 years is similar to worldwide reports. In addition, the site of the initial tic as located in the eyes or face area has been documented in a number of cross-cultural clinical studies. While a higher rate of coprolalia was observed in the U.K. cohort, our finding that the rate of coprolalia was linked to the severity of Tourette's disorder might indicate that the differences in the rate reported in earlier studies may at least be partly contributed by the differences in the severity of the condition and the source or setting of data collection. Furthermore, the higher rates noted in case studies from the 1970s and 1980s may be a reflection of the prevailing notion at that time that presence of coprolalia is necessary to make a diagnosis of Tourette's disorder.

The high rate of aggression and oppositional behaviors (oppositional defiant disorder and conduct disorder) in the U.K. cohort is interesting. It is possible that this finding is due to ascertainment bias, as the U.K. cohort was chosen from a tertiary referral specialized clinic for Tourette's disorder with higher mean scores for YGTSS and DCI, indicating a more severe form of the disorder. However, the lack of association between severity and any of the variables other than coprolalia seems to suggest that severity alone cannot explain these differences. This raises the issue of environmental and other influences on the behavior of these young people. It also highlights the need to assess psychopathology in young Tourette's disorder patients, as these comorbid conditions often pose more challenges in overall management than the Tourette's disorder itself.

Other possible reasons for increased behavioral problems in the United Kingdom compared to the United Arab Emirates may be due to sociocultural-religious differences between the 2 countries. For example, in the United Arab Emirates, family stability is high, with both parents present and often a large supportive family network. In the United Arab Emirates, there is also a strongly embedded religious discipline, a strong patriarchal presence, and strictly enforced moral and legal codes. In this regard, previous studies have reported lower rates of ADHD and conduct disorder in the U.A.E. population as compared to Western countries.[31] There is also a debate as to whether conduct problems are biologically mediated medical conditions or environmentally determined sociocultural problems. A recent Children of Twins study examining the intergenerational transmission of childhood conduct problems among children of twins observed that the

mechanisms underlying the intergenerational transmission of conduct problems for male offspring was largely mediated by an environmentally mediated causal role of parental conduct problems, while a common genetic liability accounted for the intergenerational relations in the female offspring.[32] Just as Tourette's disorder is known to have gender dependent differences in the phenotypic expression,[33] it seems that the risk for conduct disorder may also be mediated differently in the 2 genders. These findings if replicated would have implications for our understanding of the phenotypic expressions in Tourette's disorder and the comorbid conditions that are frequently encountered in the context of Tourette's disorder.

Not withstanding the fact that the U.K. cohort had more severe Tourette's disorder, our finding that the U.A.E. patients perceived less distress and impairment as compared to the U.K. patients is similar to that reported from Costa Rica.[30] This might reflect the differences in cultural perceptions as to what symptoms are considered distressing or handicapping to an individual. This finding coupled with the fact that the majority had not received a diagnosis of Tourette's disorder, similar to that observed by Mathews and colleagues from Costa Rica,[30] might mean that awareness programs focused at health professionals as well as school and other personnel who work with children are important. It may well also be that both families and physicians discount the tics as "nervous habit" or "psychogenic," thus implying a transient and simple/nonserious nature of the condition and thereby delaying the diagnosis or denying appropriate treatment of the condition. It may also reflect the fact that in the United Kingdom, there is an active Tourette's disorder association and TV coverage, both of which increase knowledge of Tourette's disorder among the lay public. Since early diagnosis can considerably reduce the burden of Tourette's disorder, it is important to educate the pediatricians, the family doctors, and the public about the disorder. Mathews and colleagues[30] observed that in Costa Rica, even when objective evidence of impairment was available, many subjects denied that their Tourette's disorder caused any distress or impairment. Similarly, in countries such as the United Arab Emirates, where cultural and help-seeking behaviors affect the definition and identification of the disorder,[34] close scrutiny of the symptom patterns and formal epidemiologic studies using appropriate ascertainment and assessment methods are indicated to know the true nature and occurrence of the disorder.

The limitations of this study include the fact that this was a descriptive and retrospective study rather than an epidemiologic or prospective study, and therefore the observations are cross-sectional with an element of ascertainment bias. However, since both cohorts were assessed by the same assessment methods and instruments and the authors had worked together for years, establishing their interrater reliability, we believe that the data are robust for the purpose of a comparison between the 2 cultures.

CONCLUSION

The findings illustrate the similarity in the core clinical symptoms and associated clinical features between the 2 populations, thus emphasizing the underlying biological and genetic basis of these symptoms. However, the potentially complex and challenging comorbid conditions such as behavioral and conduct disturbances that are often encountered among Tourette's disorder patients in the Western population seem to be the result of environmental and other modulating factors. This has implications for our understanding of the phenotypic presentation of Tourette's disorder as well as the management.

REFERENCES

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association; 2000
2. World Health Organization. International Classification of Diseases, Tenth Revision. Geneva, Switzerland: World Health Organization; 1992
3. Robertson MM. Tourette syndrome, associated conditions, and the complexities of treatment. Brain 2000;123(3):425–462
4. Freeman RD, Fast DK, Burd L, et al. An international perspective on Tourette syndrome: selected findings from 3500 individuals in 22 countries. Dev Med Child Neurol 2000;42:436–447
5. Khalifa N, von Knorring AL. Tourette syndrome and other tic disorders in a total population of children: clinical assessment and background. Acta Paediatr 2005;94:1608–1614
6. Rickards H, Robertson M. A controlled study of psychopathology and associated symptoms in Tourette syndrome. World J Biol Psychiatry 2003;4(2):64–68
7. Robertson MM, Trimble MR, Lees AJ. The psychopathology of the Gilles de la Tourette syndrome: a phenomenological analysis. Br J Psychiatry 1988;152:383–390
8. Staley D, Wand R, Shady G. Tourette disorder: a cross-cultural review. Compr Psychiatry 1997;38(1):6–16
9. Abuzzahab FS, Anderson FO. Gilles de la Tourette's syndrome: cross-cultural analysis and treatment outcome. In: Abuzzahab FS, Anderson FO, eds. Gilles de la Tourette's Syndrome: International Registry. St. Paul, Minn: Mason; 1976:71–79
10. Shapiro AK, Shapiro E. An update on Tourette syndrome. Am J Psychother 1982;36(3):379–390
11. Lees AJ, Robertson M, Trimble MR, et al. A clinical study of Gilles de la Tourette syndrome in the United Kingdom. J Neurol Neurosurg Psychiatry 1984;47(1):1–8
12. Robertson MM. Gilles de la Tourette syndrome: an update [annotation]. J Child Psychol Psychiatry 1994;35:597–611
13. Tanner CM. Epidemiology. In: Kurlan R, ed. Handbook of Tourette's Syndrome and Related Tic and Behavioral Disorders. New York, NY: Marcel Dekker; 1993:337–344
14. Robertson MM, Trimble MR. Gilles de la Tourette syndrome in the Middle East: report of a cohort and a multiply affected large pedigree. Br J Psychiatry 1991;158:416–419
15. Eapen V, Robertson MM. Gilles de la Tourette syndrome in Malta: psychopathology in a multiply affected pedigree. Arab J Psychiatry 1995;6:113–118
16. Min SK, Lee H. A clinical study of Gilles de la Tourette's syndrome in Korea. Br J Psychiatry 1986;149:644–647
17. Nomura Y, Kita M, Segawa M. Social adaptation of Tourette syndrome families in Japan. Adv Neurol 1992;58:323–332
18. Nomura Y, Segawa M. Gilles de la Tourette syndrome in Oriental

children. Brain Dev 1979;1(2):103–111
19. Nomura Y, Segawa M. Tourette syndrome in Oriental children: clinical and pathophysiological considerations. In: Friedhoff A, Chase T, eds. Gilles de la Tourette Syndrome. New York, NY: Raven; 1982:277–280
20. Robertson MM, Verrill M, Mercer M, et al. Tourette's syndrome in New Zealand: a postal survey. Br J Psychiatry 1994;164:263–266
21. Lieh-Mak F, Chung SY, Lee P, et al. Tourette syndrome in the Chinese: a follow-up of 15 cases. In: Friedhoff A, Chase T, eds. Gilles de la Tourette Syndrome. New York, NY: Raven; 1982:281–283
22. Butler IJ. Tourette's syndrome: some new concepts. Neurol Clin 1984; 2(3):571–580
23. Earls F. Psychosocial factors in Tourette syndrome. Adv Neurol 1992;58: 55–59
24. Kano Y, Ohta M, Nagai Y. Clinical characteristics of Tourette syndrome. Psychiatry Clin Neurosci 1998;52(1):51–57
25. Pushkov VV. Treatment of Tourette's syndrome. Sov Neurol Psychiatry 1988;21:72–79
26. Robertson MM, Eapen V. The National Hospital Interview Schedule for the assessment of Gilles de la Tourette syndrome. Int J Methods Psychiatr Res 1996;6:203–226
27. Leckman JF, Riddle MA, Hardin MT, et al. The Yale Global Tic Severity Scale: initial testing of a clinician-rated scale of tic severity. J Am Acad Child Adolesc Psychiatry 1989;28(4):566–573
28. Robertson MM, Banerjee S, Kurlan R, et al. The Tourette Diagnostic Confidence Index: development and clinical associations. Neurology 1999;53:2108–2112
29. Bruun RD. The natural history of Tourette's syndrome. In: Cohen DJ, Bruun RD, Leckman JF, eds. Tourette's Syndrome and Tic Disorders. New York, NY: Wiley; 1988:22–39
30. Mathews CA, Herrera Amighetti LD, Lowe TL, et al. Cultural influences on diagnosis and perception of Tourette syndrome in Costa Rica. J Am Acad Child Adolesc Psychiatry 2001;40(4):456–463
31. Eapen V, Jakka ME, Abou-Saleh MT. Children with psychiatric disorders: the Al Ain Community Psychiatry Survey. Can J Psychiatry 2003; 48:402–407
32. D'Onofrio BM, Slutske WS, Turkheimer E, et al. Intergenerational transmission of childhood conduct problems: a Children of Twins Study. Arch Gen Psychiatry 2007;64(7):820–829
33. Eapen V, Pauls DL, Robertson MM. Evidence for autosomal dominant transmission in Tourette's syndrome: United Kingdom cohort study. Br J Psychiatry 1993;162:593–596
34. Eapen V, Ghubash R. Help-seeking for mental health problems of children: preferences and attitudes in the United Arab Emirates. Psychol Rep 2004;94:663–667

