ABSTRACT

Tourette syndrome (TS) is a neurological condition consisting of motor and vocal tics that commonly presents with psychiatric comorbidities. Few studies have examined the knowledge of psychotherapy providers with regard to TS and its treatment. The present study surveyed 88 clinicians with varying types and amounts of training and compared these variables with TS knowledge using a brief knowledge quiz derived from Marcks and colleagues (2004). Significant bivariate predictors of total score on the quiz included participant age ($r = .25, p = .03$), how long participants have practiced in the field ($r = .31, p = .01$), confidence in treating TS ($r = .30, p = .01$), self-reported expertise in TS ($r = .35, p < .01$), a doctoral degree ($r = .47, p < .01$), awareness of national TS organizations ($r = .39, p < .01$), awareness of local TS organizations ($r = .27, p = .01$), awareness of Habit Reversal Training (HRT; $r = .43, p < .01$), and past professional development activities related to TS (i.e. internet research, reading books on TS, attending workshops; $r = .37, p < .01$). In a hierarchical linear regression model, a doctoral degree was found to be the strongest predictor of knowledge. Implications for consumers of therapy and clinical training organizations are discussed.
ACKNOWLEDGEMENTS

I would like to thank my committee, Sue Furrer and Meir Flancbaum, who volunteered to oversee this project, despite their many commitments. Their advice and guidance have transformed a flicker of an idea into a meaningful scientific contribution. I also owe much to the New Jersey Center for Tourette Syndrome and their director, Faith Rice, for their help in recruiting clinicians to participate. Their support has been invaluable. I would like to thank Shawn Ewbank and Lori Rockmore for their support as well. In addition, I very much appreciate the willingness of the 2014-2015 practicum students at the Tourette Syndrome Therapeutic Program at Rutgers, as well as other GSAPP students who volunteered, to pilot the survey and provide feedback. Finally, I would like to thank my parents, Dawn and Ken Benson, whose love and support have made all things in my life possible.
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Examining the Knowledge and Training of Clinicians Treating Tourette Syndrome

As Tourette syndrome (TS) is a common neurological condition related to social impairments and psychiatric comorbidities, it is important to bolster clinicians’ knowledge about this condition. However, research exploring clinician knowledge of TS is limited (Marcks, Woods, Teng & Twohig, 2004). In an effort to better understand and improve services for individuals with TS, research is needed to clarify providers' knowledge and training related to TS.

Tourette Syndrome and Chronic Tic Disorders: Diagnostic features and epidemiology

Tics are defined as “sudden, rapid, recurrent, nonrhythmic motor movements or vocalizations” (American Psychiatric Association (APA), 2013). Motor tics include twitching, eye-blinking, head turning, slow twisting movements, muscle tensing, and more complicated purposeful-looking movements such as touching and tapping (Kurlan, 2010). Vocal tics (also called phonic tics) include noises such as sniffing, throat clearing, coughing (simple vocal tics), or syllables or words (complex vocal tics). TS is a disorder characterized by motor and vocal tics. Other chronic tic disorders include Chronic Motor Tic Disorder, which consists only of motor tics, and Chronic Vocal Tic Disorder, which consists only of vocal tics. The onset of TS is by definition under the age of 18 (APA, 2013).

Coprolalia is a complex vocal tic in which an individual involuntary utters obscene words or syllables. People often erroneously believe that this tic defines the disorder and that the absence of coprolalia precludes diagnosis (Kurlan, 2010). In actuality, coprolalia occurs in less than 50% of individuals with TS, with some estimates as low as 15% (Freeman et al., 2009).
Estimates of the lifetime prevalence of TS range from less than 1 in 1,000 to about 1% or more (Kurlan, 2010; Scharf, Miller, Matthews, & Ben-Shlomo, 2012). A precise estimate is difficult, partly because a substantial portion of individuals with tics never receive a formal diagnosis.

**Course of Tics**

The onset of tics typically occurs between ages 4 and 6 years (APA, 2013; Bloch & Leckman, 2009). The first tics are most often simple movements such as eye blinking, nose twitching, or facial grimacing. Vocal tics typically manifest themselves a year or two after the first motor tics. With increasing age, both motor and vocal tics tend to become more complex (Leckman et al., 1998). Often, tic symptoms occur in bouts and wax and wane over time (Bloch & Leckman, 2009). While factors such as stress, anxiety, and fatigue are known to exacerbate tics in many individuals, focused concentration, especially involving fine motor movements such as playing a musical instrument, dancing, or playing sports, tends to alleviate tics (Conelea & Woods, 2008). Many individuals are able to suppress tics temporarily but often at the expense of much concentration and energy. As children get older, they typically develop a greater ability to suppress tics (Bloch & Leckman, 2009).

Tics typically reach their peak severity in the second decade of life (Bloch & Leckman, 2009; Leckman et al., 1998). In most cases, this period is followed by a steady decline in tic severity during adolescence (Bloch & Leckman, 2009). Research suggests that, even without treatment, approximately one-third of children with TS are completely or nearly tic-free in adulthood while less than half have minimal or mild tics and about 20% of adults experience
moderate to severe tics. Only a small percentage (less than 5%) experience more severe tics in early adulthood than they did in childhood. Interestingly, the onset of puberty does not seem to bear a statistical relationship to the timeline or severity of tics (Leckman et al., 1998).

**Impairment and comorbidity**

Individuals with TS often experience significant functional impairment and present with psychological comorbidities (Cutler et al., 2009). Cutler and colleagues found that poorer quality of life is associated with increased tic symptom severity, comorbid attention-deficit/hyperactivity disorder (ADHD) diagnosis, and the presence of obsessive-compulsive behaviors. Conelea and colleagues (2011) found chronic tic disorders generally to be associated with mild to moderate impairment. This study also confirmed the high positive correlation between severity of tics and impairment, as well as a similar positive correlation between the presence of one or more comorbid psychiatric diagnoses and increased psychosocial impairment.

Comorbidities often cause the most impairment for individuals with TS who present to treatment, especially ADHD, obsessive-compulsive disorder (OCD), intermittent explosive disorder, oppositional defiant disorder, and anxiety disorders (Kraft et al., 2012). Kraft and colleagues also found clinically significant disruptive and defiant behavior to be twice as likely in the TS population and anxiety and depression to be four times as likely. Rates of co-occurring OCD are as high as 30% and much higher when including sub-clinical obsessive-compulsive symptoms (Piacentini, Pearlman, & Peris, 2007). Chen and colleagues (2012) found that explosive outbursts characteristic of intermittent explosive disorder occurred in 20% of individuals with TS. The number and severity of comorbidities appear to have substantial
impact on the quality of life of persons with TS. In addition, embarrassment or shame related to having tics can precipitate depressive symptoms and low self-esteem (Robertson, 2006).

**Psychotherapeutic Interventions for Tics**

While many individuals experience only mild to moderate tic symptoms that cause minimal or mild functional impairment, tics themselves can for others be a significant clinical concern. In such cases, tic management is an important therapeutic goal. Various treatment strategies exist, including both pharmacological and behavioral approaches. The medications with the strongest research support are the traditional antipsychotic medications such as pimozide (Orap) and haloperidol (Haldol), as well as atypical antipsychotics such as risperidone (Risperdal) and olanzapine (Zyprexa; Scahill et al., 2006). However, due to the unpleasant and sometimes severe side-effects that these medications can cause, patients are instead often prescribed more mild drugs, especially anti-hypertensives such as clonidine (Catapres) and guanfacine (Tenex). In terms of psychotherapeutic strategies, methods investigated include massed practice, contingency management, relaxation, and habit reversal training (HRT). The intervention with the strongest empirical support is Comprehensive Behavioral Intervention for Tics (CBIT), which consists primarily of HRT and contingency management techniques (Willhelm et al., 2003; Woods et al., 2011). In fact, this intervention has been shown in research to be possibly as effective in reducing tic frequency and intensity as the most potent medications (Woods et al., 2011).
**Therapist competence**

Though research has clarified many aspects of TS, including effective treatments, few studies have examined the competence or knowledge of clinicians in providing services to individuals with tic disorders. In terms of general therapeutic competence, research has suggested that knowledge is an important factor. For example, Barber, Sharpless, Klosterman, and McCarthy (2007) define intervention competence as “the judicious application of communication, knowledge, technical skills, clinical reasoning, emotions, values, and contextual understanding for the benefit of the individual and community being served” (p. 494). It also stands to reason that clinicians should have relevant knowledge about the disorders and characteristics of the patient populations that they are treating (Kaslow, 2007). Such knowledge contributes to competence regarding indications and contraindications of treatment, combination with other treatments, and decision-making within treatment (e.g. knowing how to assess whether the patient is approaching therapeutic goals or whether treatment needs to be modified or abandoned; Fairburn & Cooper, 2011).

Knowledge of effective interventions and their specific components is also a key element of competently treating patients. Therefore, treating TS competently necessarily includes knowledge of effective interventions for managing tics, as well as of tic symptoms, the course of TS, social impairments associated with tics, and psychiatric comorbidities and their implications. In one of the few studies to examine TS knowledge among clinicians, Marcks, Woods, Teng, and Twohig (2004) surveyed 443 physicians and psychologists in the greater Milwaukee, Wisconsin, area via mail and received 67 completed surveys (a 15% response rate). Measures
included 18 general knowledge questions about TS, quizzing the respondents about TS diagnostic criteria, social functioning in persons with TS, prevalence and course of the disorder, etiological factors, current empirically supported treatments for TS, common comorbidities, and educational rights for persons with TS. The authors found that respondents answered 77% of the general knowledge items correctly. The authors also included a “TS Experience” item that asked providers how many clients with TS they have treated. They found no differences between physicians and psychologists. They did find a trend level difference between respondents who had not seen a single TS case clinically and those who had seen at least one, where the latter answered more of the items correctly.

Marcks and colleagues (2004) also note some limitations in their study. The authors sent the survey out to a variety of both physicians and psychologists, many of whom had little or no experience with TS. Furthermore, due to the small sample, they were only able to use a dichotomous variable in their analyses for measuring TS experience, where seeing one TS case was equated with having TS experience. Therefore, it is unclear the level of knowledge of clinicians who see multiple TS cases or who claim expertise as compared with other clinicians who may have seen only one or two cases. Lastly, the study did not ask about providers’ level of training, so it is not clear whether training on treating TS is available and adequate.

The purpose of the present study was to survey clinicians to better understand their level of experience and education related to TS in order to replicate and expand the research conducted by Marcks and colleagues (2004). The survey aimed to assess clinicians' knowledge and key beliefs related to TS and explore variables that may be related to increased knowledge,
including the amount and types of training in treating TS. In addition, the present study aimed to recruit a larger sample than obtained in previous research, to include a broad range of clinicians, including masters-level counselors and social workers, and to include clinicians with significant experience treating TS.

Methods

Participants and Procedures

All methods were reviewed and approved by the Institutional Review Board at Rutgers University. Participants were recruited via professional psychology and social work organization electronic mailing lists. An email was sent to the various lists containing a link to an IRB-approved consent form, followed by a survey that contained all of the study measures. In order to include clinicians with substantial experience with TS and, thus, look more closely at the possible relationship between experience with TS patients and knowledge, participants were also recruited specifically from a referral list of a statewide not-for-profit advocacy organization for individuals with TS and associated disorders.

A total of 106 people consented to the study and began the survey. Of those, 18 people chose not to finish the survey, and their data was not included in the final analysis. For the 88 people who completed the survey, 63 (72%) were female. Seventy-seven (91%) identified themselves as Caucasian, 4 (5%) as African-American, 3 (3%) as Asian, and 3 (3%) as Other. Four participants (5%) also identified themselves as Hispanic or Latino(a). The mean age of participants was 46.8 years, with ages ranging from 26 to 86.
Participants included 58 doctoral-level psychologists (66%), 18 masters level clinicians (21%), 5 physicians (6%), 2 students (2%), and 5 who identified “Other” as their profession (6%). Including physicians in the sample (who have seen many more individual patients than nonphysicians in the sample), the average number of TS patients seen by clinicians surveyed was 12.5, with numbers ranging from 0 to 300 patients. See Table 1 for a detailed list of participant characteristics.

Materials

The survey was created and answered through the online survey software Qualtrics. The primary measure was a 21-item knowledge questionnaire adapted from Marcks and colleagues (2004). The survey included 23 additional items concerning the participants' professional credentials and experience, clinical experience with patients with TS, level of training in relation to TS, and self-rated views of competence in treating patients with TS.

Results

General Knowledge

The average score on the knowledge quiz was 74% (SD = 10.66%; see Table 2). Significant bivariate predictors of total score on the quiz included participant age (r = .25, p = .03), how long participants have practiced in the field (r = .31, p = .01), confidence in treating TS (r = .30, p = .01), self-reported expertise in TS (r = .35, p < .01), a doctoral degree (r = .47, p < .01), awareness of national TS organizations (r = .39, p < .01), awareness of local TS organizations (r = .27, p = .01), awareness of HRT (r = .43, p < .01), and past professional development activities related to TS (i.e. internet research, reading books on TS, attending
workshops; r = .37, p < .01). A hierarchical linear regression analysis was conducted to examine the relationship among the above factors and TS knowledge. General therapist factors including age, years in practice, and whether or not participants had a doctoral degree were included in the first block while all other variables (TS-specific factors) were included in Block 2. The model was significant (F = 10.37, p < .01), and, as indexed by adjusted $R^2$, it explained 30.00% of the variance in knowledge scores. In the model, only a doctoral degree made a statistically significant unique contribution ($b = 2.88; t = 4.32; p < .01$). As indexed by semi-partial $r^2$, this variable explained 17.98% of the variance in knowledge scores.

*Professional Development*

The professional development variable included in the regression analysis was based on four survey items, assessing whether participants had (1) conducted internet-based reading related to TS, (2) attended a webinar or online workshop related to TS, (3) read a book about TS, and (4) attended a local conference or workshop on TS. Each of these items was significantly correlated with total quiz score. However, there were no significant differences between these correlations. These items taken together were found to have adequate internal consistency ($\alpha = .72$). Therefore, a combined item was created using a total score from each of the four individual items. A 5th item assessing whether participants had attended a conference or workshop pertaining to TS located greater than 50 miles from their residence or place of business was excluded, as it was not a significant bivariate predictor. See Table 3 for a complete list of professional development activities and the proportion of participants who self-reported participation in each.
Test of Moderator Effects

Only a small number of physicians (5 in total; 6% of the sample) completed the survey. When data of physicians and non-physicians was analyzed separately, the data was similar in the non-physician group as compared to the total group in predicting total knowledge. Therefore, only the total group was included in all subsequent analyses.

Specific Items

Nearly every respondent knew that tics are not purposeful or intentional movements (M = .99; SD = .11). Likewise, the vast majority correctly believed that discussing tics has no long-term deleterious effects (M = .99; SD = .11). Among the most commonly missed questions were whether or not psychostimulants worsen tics (M = .36; SD = .48), whether or not suppressing tics worsens them (M = .38; SD = .49), whether TS occurs at a higher rate in certain ethnic groups (M = .47; SD = .50), and whether or not antipsychotic medications are currently one of the two most effective treatments for tics (M = .47; SD = .50).

Clinicians with all levels of TS experience, with varying degrees of education and interest in TS, and from diverse backgrounds endorsed the belief that tic suppression leads to a worsening of tics after suppression is discontinued, with no bivariate predictors identified. Similarly, the full range of participants endorsed the belief that there is empirical evidence that psychostimulants cause tics to worsen in patients with TS. Similarly, no significant bivariate predictors were found in relation to people’s likelihood to agree that antipsychotic medications are one of the most effective treatments for tics.
Participants with a doctoral degree were significantly more likely to answer correctly that there are no ethnic differences in TS prevalence ($r = .34; p < .01$). No other significant bivariate predictors were found for this question. As indexed by $R^2$, the possession of a doctoral degree explained 11.56% of the variance in the belief that TS is equally prevalent across ethnic groups. See Table 2 for a detailed list of commonly missed items.

*Interest in Learning*

Seventy-two percent of individuals surveyed reported interest in learning more about TS. Only half of participants reported having heard of habit reversal training (HRT), and only 23% knew how to implement the intervention. Seventy-five percent of the participants were interested in learning more about HRT. About half of the participants reported that they were unaware of a national (51%) or local (56%) organization devoted to TS.

*Discussion*

*General Knowledge*

The average score on the knowledge quiz was 74%. This result is comparable with previous survey research by Marcks and colleagues (2004) who obtained an average score of 77% in their survey of physicians and psychologists. The sample for the present study consisted of a very few physicians and a greater range of therapy providers, including several clinicians with extensive experience treating TS. However, the knowledge quiz was adapted in that questions were added and arguably more difficult items, such as those asking about the effects of tic suppression and stimulant medication, were included.
Predictors of general knowledge

The results suggest that a doctoral degree in general and, to some degree, specific educational activities relating to TS, increased knowledge of TS and its treatment. This is consistent with the literature that shows that reading books and attending trainings increase knowledge (Forsetlund et al., 2009). It is not surprising that clinicians with a doctoral degree have more knowledge about a specialized subject such as TS. A doctoral degree may provide more comprehensive training in psychiatric conditions since it typically involves several more years of training, additional coursework, and a more substantial research requirement than masters programs. As most clinicians do not have doctoral degrees, focused attempts to reach masters-level clinicians in particular may help to improve the knowledge of TS among clinicians overall. From the perspective of the patient or consumer, families seeking treatment may find that clinicians with a doctoral degree are more knowledgeable about TS-specific factors, such as rebound effects or implications for the use of stimulant medications for comorbid ADHD and tics.

Effective treatment relies on more than knowledge alone however. Barber and colleagues (2007) emphasize that therapist competence includes the judicious application of knowledge, skills, clinical reasoning, emotions, values, and contextual understanding. Consequently, although experienced clinicians may be more knowledgeable, they may not provide better care. In fact, research has not supported a difference in therapy outcome based on therapist experience alone (Leon, Martinovich, Lutz & Lyons, 2005). Literature on training and dissemination has also shown that although books, didactic presentations, and workshops increase knowledge, they
do not necessarily lead to large changes in behavior (e.g. Forsetlund et al., 2009), although there is no research of which the author is aware that looks specifically at TS treatment. Therefore, simply because clinicians with a doctoral degree have more knowledge does not necessarily mean that they are more competent in treating patients.

Specific Knowledge Items

The most commonly missed items on the survey deserve some attention. In the present study, the majority of the participants endorsed a belief that suppressing tics causes them to worsen, a result consistent with previous research (Marcks et al., 2004). Such a response may be related to a perceived phenomenon known as the tic rebound effect, in which tics can be successfully suppressed for a limited time period, such as during the school day, and then occur with increased frequency and severity after school to compensate for the period in which the tics were not present. Research on the presence of a rebound effect is sparse. Himle and Woods (2004) conducted a carefully controlled investigation of seven children using a repeated measures design. In the study, subjects’ tics were measured at baseline, subjects were told to suppress their tics and the tics were measured during the suppression period, subjects were told to stop suppressing and tics were measured, subjects were told again to suppress their tics and the tics were measured, and the tics were measured a final time after the children were told to stop suppressing again. Tic frequency was significantly lower in suppression periods than in non-suppression periods, and tic frequency during post-suppression was higher than in suppression periods but significantly lower than baseline levels, arguing against a rebound effect. Though corroborating evidence is lacking, this study does not support the validity of the rebound
effect. The implications of a belief in this phenomenon is important, as providers who believe in the rebound effect may advise against behavioral treatment for tic management.

Individuals across different backgrounds and levels of experience also endorsed the belief that stimulant medication can increase tics in patients with TS. However, multiple studies have found evidence to the contrary. The Tourette Syndrome Study Group (2002), for example, found that tics decreased overall in patients with TS and ADHD taking methylphenidate when compared with those in the placebo condition. Additionally, a meta-analysis of 9 studies involving 477 patients found no evidence that therapeutic doses of stimulants increased tics (Bloch, Panza, Landeros-Weisenberger & Leckman, 2009). The authors found that supratherapeutic doses of dextroamphetamine worsened tics in the short term, but no dose of methylphenidate (Ritalin) was found to increase tics. A more recent review of 8 randomized controlled trials from the Cochrane Collaborative also concluded that in the majority of children with TS and ADHD, both tics and symptoms of ADHD improved on stimulant medication, though very high doses of stimulants may transiently increase tics in some patients (Pringsheim & Steves, 2011). The lack of provider knowledge about the relationship between tics and stimulant medication, as well as gaps in knowledge about other aspects of tics, such as their prevalence in different ethnic groups and pharmacological treatments for them, highlight the need for more pinpointed training and dissemination efforts to ensure that clinicians treating TS are well informed about the disorder. That many clinicians in the study were unaware of national and local TS organizations, such as the Tourette Association of America, further underscores the need to expand dissemination efforts targeting clinicians.
Interest in Learning

While the present study revealed several gaps in knowledge about TS, the survey also suggested that many clinicians are interested in learning more about TS and its treatment. However, these same providers are unaware of where to receive this information. Efforts to improve dissemination of knowledge, therefore, should also explore methods of advertising to those clinicians most likely to be interested in learning. Furthermore, educational materials, workshops, and other educational resources should include information about the Tourette Association of America, local chapters of this organization, and other local and national organizations with relevant resources.

Limitations

The sample used in the study, though consisting of a variety of types of therapy providers with a wide spectrum of TS experience, may not accurately represent a cross-section of clinicians in the United States. Furthermore, the variables explored in this study explained only a portion of the variance in TS knowledge. Therefore, many other factors may exist that influence clinician knowledge more than those targeted in the present study. In addition, the sample was not large enough to find all relationships that might exist between the factors explored and clinician knowledge. For example, no relationship was found between TS experience and knowledge, as measured by the number of patients with TS that a clinician has seen. However, variables that did not show a significant relationship to knowledge in the present study cannot be completely ruled out, and a larger and more diverse sample could detect additional important relationships.
In addition, the present research examined only clinician knowledge, but, as mentioned, knowledge is only one aspect of therapist competence. Patients with TS deserve treatment by highly competent clinicians. While this study may help to elucidate factors related to TS knowledge, it does not address any other areas of competence, such as clinical decision making or proficiency in implementing specific clinical techniques. Clinicians can receive continuing education in a variety of ways, such as by reading articles or book chapters, watching presentations online or in person that involve demonstrations of skills, or participating in more interactive workshops that allow for asking questions and practicing the specific techniques. While the present study is consistent with previous research suggesting that knowledge can be as easily imparted from reading material as it is from in-person presentations, workshops involving behavioral rehearsal may be necessary to increase competent use of skills in therapy (Beidas, Cross, & Dorsey, 2014).

**Future Directions**

Future research should involve developing specific training modules for clinicians that target lesser known or often misunderstood scientific findings about TS and tics. These findings include that TS seems to occur equally across ethnic groups, that antipsychotic medications are the most effective class of drugs in managing tics, that current empirical evidence suggests that tic suppression does not lead to a tic rebound, and that there do not appear to be harmful long-term effects of stimulants on tics. Such research could explore whether existing professional development programming adequately covers this information and whether greater emphasis can increase clinician knowledge. In addition, future research could examine other aspects of
therapist competence in treating TS, such as technical skills and clinical judgment, and their relationship with outcome. Research could also explore the most effective ways to provide training that will increase clinician competence in treating TS.

Future research to identify the appropriate target audience for professional development programming would also be beneficial. Since attainment of a doctoral degree had greater explanatory power in the present study compared to TS-specific training experiences, it would be important to investigate how TS-specific professional development activities can better impart knowledge to clinicians with masters degrees. Did the doctoral-level providers surveyed in the present study learn more about TS during their formal education or attend different trainings than those clinicians with a master’s degree? Or perhaps the knowledge or skills acquired in more research-oriented degree programs enable doctoral level clinicians to extrapolate valuable information from professional development sources more effectively. Future research could explore these possibilities and help determine the most effective ways to target masters-level clinicians in knowledge dissemination efforts. In addition, this line of research could explore whether such targeted attempts toward masters-level clinicians increases knowledge among the overall population of clinicians as well as whether such increased knowledge would lead to improved TS treatment competence and overall therapeutic outcomes among TS patients.

Conclusion

The current study helped to gauge clinicians’ overall knowledge about TS, discover information about TS that is commonly misunderstood among clinicians, and explore factors related to clinician knowledge. The resulting survey revealed several gaps in knowledge.
Several survey participants endorsed ethnic differences in TS prevalence, failed to identify antipsychotic medications as an effective treatment for tics, endorsed a belief in a tic rebound effect, and endorsed that stimulant medications worsen tics. The current body of empirical research refutes all of these conclusions. For clinicians who assess and/or treat patients with TS, an accurate understanding of the disorder and its treatment is important in order to combat the misconceptions of patients and their families, as well as some healthcare providers. Several factors were found to be associated with clinicians who had greater knowledge of TS, with the strongest being the attainment of a doctoral degree. Though these results have implications for researchers, clinicians, and patients, they do not imply that clinicians with doctorates are altogether more competent in treating patients with TS. Further research is necessary to replicate these findings and determine whether the knowledge differences found translate into differences in overall competence.

Resources

Tourette Association of America: http://tourette.org

New Jersey Center for Tourette Syndrome and Associated Disorders: http://njcts.org
References


Conelea, C.A., Woods, D.W., Zinner, S.H., Budman, C., Murphy, T., Scahill, L.D., . . . Walkup,


Table 1  
**Demographic Characteristics**

<table>
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<td>Male</td>
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<tr>
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