

**Tourette's syndrome and its existence has been established for over a century. Despite that, there is considerable information that we are yet to obtain regarding the unique nature of this condition. Describe the current underpinnings of Tourette's syndrome with focus on its presentation and impact on patients.**

### ***Abstract***

Tourette's syndrome is a developmental condition affecting how the brain functions normally. It was first described in the late 1800s and was thought to involve motor movements or vocal sounds against the person's wishes. The complexity of these unwanted outputs varies depending on the progression of the disease and can often be accompanied with other mental and brain disorders. This increased complexity positively correlated with the decreased quality of life found in these patients. Finding and diagnosing Tourette's syndrome has proven to be a challenge overtime due to the lack of public education on top of it affecting all age groups as well. With increased research there have been more sensitive diagnostic tools and rating scales to help distinguish this condition from other closely related ones.

Tourette's syndrome (TS) remains a global burden since it had been discovered and named after the doctor himself, Dr. Georges Gilles de la Tourette who was the first to describe this degenerative cognitive condition in 1885 [1]. Even though there have been many advancements in research regarding TS, medical professionals are yet to fully understand the causes, as well as all the pathophysiology underpinning associated with TS [2]. In light of this, this essay will be examining what TS is, its causes and its epidemiology. Furthermore, this essay will consider the psychosocial aspects of TS and the impact this has on the patient's lifestyle; this will continue towards the possible tests performed to reach a diagnosis, treatment options and how we can contribute towards improving the quality of life amongst individuals with TS.

In order to consider other aspects of TS, it is useful to begin by introducing the definition of TS. "Tourette's syndrome is a condition that causes a person to make involuntary sounds and movements called tics" [3]. Tics can be motor and result in movement, or vocal involving sounds. Adding onto this, tics are categorised into two groups: simple and complex [1]. These groups differ since simple tics involve sudden repetitive movements over a short period of time and would only include a few muscles, with examples being grunting sounds or head jerking. On the other hand, complex tics are more distinct, coordinated and would involve several muscles, such as jumping or touching objects. More complex tics can include words or phrases, such as Coprolalia, in which socially unacceptable words such as swearing are used [1]. However, this is only present in 10-15% of individuals with TS. Despite the cause of TS not being fully established, doctors have been able to further their understanding through extensive longitudinal peer-reviewed research. By looking at the results collected overtime, the evidence strongly suggests that TS is characterized as a neurodevelopmental disease. This was reinforced further due to a positive correlation found between the likelihood of tics and brain development [2]. Medical professionals were also able to classify TS as a comorbid condition, ranging from disorders such as Attention deficit hyperactivity disorder (ADHD) and Obsessive-compulsive disorder (OCD). To be able to recognise the other underlying conditions associated with TS, we must first acknowledge

the data and information collected in the epidemiology of TS and interpret these results, to determine plausible risk factors for TS.

According to a study conducted by Centers for Disease Control and Prevention (CDC), which investigated the epidemiology of TS across the USA, TS can occur amongst all age groups, most commonly between the ages of 6-18 years old [4]. The exact number of cases were unknown, and this is evident as 1 in 162 children were found to have TS, but only 1 in 360 were diagnosed, suggesting that roughly half of children with TS are not diagnosed [4]. This can be due to a lack of education amongst parents, causing them to think the certain movements and noises being done by their children was normal and not a cause for concern. A survey done by CDC, focusing on parents that have children with TS reinforces this claim as the average time found from initially noticing the tic to receiving a diagnosis was roughly 2 years [4]. CDC also found that 86% of individuals with TS had at least one more neurobehavioral condition such as depression and anxiety, supporting the idea of TS being a comorbid in the majority of TS cases as opposed to a single condition. Certain risk factors were shown because of all the data accumulated, and CDC found that boys were 3 to 5 times more likely to have TS. Age was also a possible risk factor, as 12-17 year olds were found to be twice as likely to get TS than 6-11 year olds [4]. With all the co-occurring health conditions associated with TS, it is essential to consider the psychological and social implications that can arise with having multiple conditions that collectively restrict the persons daily lifestyle.

Numerous studies have supported the idea that tic severity plays a role in impacting the person's daily lifestyle, and have found that the more severe tics were, the more it restricted daily activities [5]. This can be mentally damaging to these individuals as multiple activities, previously thought to be easy and manageable suddenly become increasingly difficult to do. This degree of impact was supported by a study that found a link between tic severity and increased symptoms of depression and anxiety [6]. More research was done to allow the collection of data that can further support these statements; this involved monitoring 35 children with TS in secondary school to study the implications TS has on

children [7]. The results showed the majority of the students with TS experienced a certain level of difficulty in their everyday school life. The 3 common themes experienced by these students were: increasing difficulty in academia, negative remarks from teachers and students, and trouble managing their emotions, such as anger or anxiety. [7] These co-occurring themes varied between the students, due to the difference in severity of their tics as well as whether it involved motor or vocal tics, which factored into what hardships they experienced. This was shown in the study which portrayed that 62.9%, 57.1% and 25.7% of students felt those 3 major themes respectively, strengthening the idea that most students with TS are disadvantaged from an academic standpoint [7]. Students with motor tics generally found homework and handwriting arduous, which was shown to increase the negative comments from teachers, and this can be one of many contributing factors towards the elevation in depression and anxiety found in students with TS; this in turn makes it more difficult to control these emotions without the necessary counselling or assistance. This can also be said with vocal tics, which resulted in negative responses from teachers and students. The latter can be a source of ridicule and a form of bullying towards students with TS and can severely impact the students' emotional and mental wellbeing as a consequence. Despite these promising findings that support the idea of people with TS being disadvantaged, the sample size used was small which can question the reliability of these results on a wider scale. With that in mind, this study can act as a form of health promotion for TS thereby increasing its public awareness, with the hopes of more longitudinal research being conducted to reach a more accurate conclusion. Once these psychosocial conditions are established and diagnosed, medical professionals can shed some light when deciding what approach to take to alleviate these symptoms, in the form of cognitive and pharmacological therapies.

Currently, multiple diagnostic tools are used in order to confirm TS in a patient. This can include blood tests, and magnetic resonance imaging (MRI), with the purpose of ruling out other conditions that can often be confused with TS. To reach a diagnosis of TS, multiple motor tics and at least one vocal tic must be displayed for at least 12 months [8]. Rating scales can be used by clinicians to better assess the patient's psychological and social

impairment to help diagnose the severity of TS in the patient. The Children's Global Assessment Scale (CGAS) is one of the common rating scales used, which measures the severity of impairment amongst children, based on a 1-100 scale meaning the lower the score, the greater the impairment found on the individual [9]. Rating scales are found to be generally comprehensive, as they can provide an opportunity to track improvements in the scores overtime as well as to review the current response to the treatment provided [10]. Once the diagnosis of TS is established, the medical practitioner can recommend numerous treatment options that can help alleviate certain symptoms that an individual with TS may face regularly. Unfortunately, there is no current cure for TS, but medication can be given to reduce tics such as fluphenazine, a dopamine blocker, while antidepressants can be used to manage depressive episodes [11]. The doctor can also offer mental health treatment plans as well as counselling to regularly review the patient's psychosocial aspects and their quality-of-life overtime.

The need for spreading awareness becomes apparent when considering the possibility of comorbid conditions arising when concerning TS. Even though it was found that tics generally improved after the age of 18, this was generally not the case when concerning these comorbid conditions, suggesting that the chances of these accompanying conditions remaining, and even progressing overtime was likely [12]. With the current information at hand, monitoring children as they mature for psychosocial impairment and comorbid conditions becomes a main priority, as this will lead to reduced rates of depression, anxiety, and an overall better quality of life. Furthermore, the increased education will aid the public in being more aware and mindful around people exhibiting tics as well as help provide a nurturing and supportive environment for them rather than a negative judgemental one. Increasing the importance of these initiatives will pave a way forward for TS patients not feeling restricted or even inferior to healthy people that surround them in their day-to-day life.

Our understanding of TS has certainly improved immensely overtime, as we generate more results and findings, however there is still much we do not understand about this condition.

This paves way for more research to be conducted as this is a recurring theme in medicine. The more we study TS the closer we are towards finding a more effective treatment option that can ultimately lead to curing the condition as a whole.

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