Health status, health related behaviours and chronic health indicators in people with Tourette Syndrome: A Canadian population-based study

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ABSTRACT

Tourette Syndrome (TS) is a childhood onset neuropsychiatric disorder. The objective of this study was to compare self-perceived health status, health-related behaviours, and chronic health conditions in individuals with and without TS using population-based data. Data were derived from Canadian Community Health Survey (CCHS) 2010 and 2011 cycles. The CCHS is a national population-based cross-sectional survey that collects information related to health status for Canadians. We evaluated the association between TS and self-perceived health, health related behaviours and chronic health conditions. 122,884 Canadians participated with 122 participants diagnosed with TS. After controlling for age and sex, the TS population was significantly less likely to have good self-perceived physical health and significantly more likely to need help with instrumental activities of daily living. More individuals with TS were diagnosed with an anxiety disorder, a mood disorder, or asthma. We observed no significant differences in health related behaviours between individuals with TS and the general population other than a higher odds of consultation for mental health. Individuals with TS experience a higher frequency of anxiety and mood disorders, and require more assistance with activities of daily living than the general population.

1. Introduction

Tourette Syndrome (TS) is a childhood onset neuropsychiatric condition characterised by the presence of multiple motor and at least one vocal tic. Once thought to be a rare condition, epidemiological studies of the prevalence of TS have shown that it is common in school age children, with a pooled prevalence of 7.7 per 1000 children (Knight et al., 2012). Tics tend to peak in intensity between the ages of 10 and 12, and improve in late adolescence, with some individuals reporting a complete remission of tics by adulthood (Bloch et al., 2006). Estimates of adult prevalence are scarce, but two studies of 16–17 year olds found a pooled prevalence of 0.5 per 1000 (Knight et al., 2012), suggesting that a significant proportion of individuals with TS no longer meet diagnostic criteria for the disorder by adulthood.

Data on health related quality of life in individuals with TS have come almost exclusively from clinically ascertained samples (Evans et al., 2016), with the exception of one internet-based survey (Conelea

et al., 2013). A recent systematic review (Evans et al., 2016) summarized existing studies in children and adults, and reported that, in children, quality of life is importantly impacted by the comorbid diagnosis of attention deficit hyperactivity disorder, while in adults, quality of life is strongly affected by comorbid anxiety and depression. Both physical and emotional domains of quality of life are impacted, with adults reporting difficulties carrying out activities of daily living. A disease specific quality of life measure has been developed and validated, the Gilles de la Tourette Syndrome Quality of Life scale (GTS-QOL)(Cavanna et al., 2008). This instrument includes psychological, physical/activities of daily living, obsessive-compulsive and cognitive domains, reflecting aspects of the condition most strongly associated with quality of life in individuals with TS.

Studies of comorbidity in individuals with TS have largely focused on psychiatric comorbidity, with a few notable exceptions. Chang et al. 2011 reported an association between TS and allergic conjunctivitis, allergic rhinitis, asthma, and atopic dermatitis in a matched case-

control study using the Taiwan National Health Insurance Database. Kwak et al. 2003 studied the prevalence of migraine headache in a clinical sample of children and adults with TS, and reported that 25% satisfied diagnostic criteria. Data on associations between TS and other chronic health conditions have not, to our knowledge, been published, nor have data on physical activity, or other health related behaviours in individuals with TS. While Conelea et al. 2013 reported rates of tobacco and alcohol use to reduce tics, cope with tic consequences and reduce premonitory urges, data on actual rates of smoking and alcohol use are not available for the TS population.

In order to expand knowledge of self-perception of health status and chronic health conditions, we performed a Canadian population-based study of adolescents and adults on the association between diagnosed TS and self perceived health status, health related behaviours such as diet, physical activity, smoking, and alcohol use, and chronic health indicators, including limitations on activity of daily living, body mass index and chronic physical and mental health conditions. We hypothesized that diagnosed TS would be associated with poorer self-perceived health status and comorbid mental health conditions, in keeping with previous research.

2. Methods

2.1. Subjects

Canadian data on individuals diagnosed with TS were retrieved from the Canadian Community Health Survey (CCHS) 2010 and 2011 cycles. The CCHS is a Statistics Canada cross-sectional survey that examines various aspects of physical and mental health of the Canadian population, and health related behaviours such as use of health care services and lifestyle. The CCHS surveys Canadians age 12 and older living in the ten provinces and three territories in Canada, but excludes persons living on reserves and other Aboriginal settlements, full-time members of the Canadian Forces, institutionalized populations, and certain remote regions in Quebec and Nunavik. In the 2010 and 2011 surveys, the excluded population represented less than 3% of the target population.

2.2. Survey design

The CCHS has three components: (1) common contents collected from all survey respondents each year, (2) optional contents administered to selected regions, and (3) rapid response components addressing specific issues related to population health. For this study, we selected relevant questions from the common contents only, and ensured that each question was asked to all respondents in each survey. CCHS uses a computer-assisted interviewing (CAI) design, thereby creating a logical flow into and out of questions based on the responses of the participants. Sampled households are selected into the survey through the use of an area frame, telephone list frame, and a random-digit dialing (RDD) frame. The area frame is constructed using multistage random cluster design with the household as the final sampling unit. The telephone list frame is used to complement the area frame. Participants ascertained from the area frame are interviewed in person, whereas participants ascertained from the telephone list frame are interviewed over the telephone. In most cycles, approximately half of participants were interviewed in person. The design and conduct of the survey have been validated by Statistics Canada, and responding to the survey is voluntary. The Canada-level response rate for the CCHS in 2010 was 71.5% and for 2011 was 69.8%.

2.3. Diagnosis of TS

For both the 2010 and 2011 surveys, individuals were asked if they had ever been diagnosed by a health professional with TS as part of the National Population Health Survey of Neurological Conditions, which was administered with the CCHS. The following explanatory statements were provided: "*Now I'd like to ask about neurological conditions, which are conditions that affect the brain, spinal cord, nerves or muscles*" and "*We are interested in conditions which are expected to last or have already lasted 6 months or more and have been diagnosed by a doctor or other health professionals.*" Participants were then asked, "*Do you have Tourette Syndrome?*" Respondents who responded "yes" were categorized as the TS population while those who responded "no" were categorized as the non-TS/general population. Those who did not answer the question (3% of the total sample) were excluded from further analysis.

2.4. Variables studied

We combined the respondents from 2010 and 2011 according to methods recommended by Statistics Canada and examined the prevalence of TS in the total population surveyed and sociodemographic characteristics (results reported previously)(Yang et al., 2016). For this study, the variables examined from both 2010 and 2011 CCHS surveys include questions about (i) self-perceived health status, which includes perceived opinions about self-perceived physical health status, self-perceived mental health status, self-perceived satisfaction with life, self-perceived work stress, self-perceived life stress, and self-perceived sense of belonging to local community, (ii) health related behaviours including daily fruit/vegetable consumption, level of physical activity, smoking status, and alcohol consumption, and (iii) chronic health indicators, including BMI, and certain chronic health conditions. Chronic health conditions evaluated in the survey included health professional diagnosed asthma, arthritis, back problems, high blood pressure, migraine, ulcers, bowel disorders (including Crohn's Disease, ulcerative colitis, Irritable Bowel Syndrome or bowel incontinence), mood disorders (including depression, bipolar disorder, mania or dysthymia) and anxiety disorders (including phobia, obsessive compulsive disorder or panic disorder).

The variables examined that were found only in the 2010 survey included any injuries in the last 12 months, any restrictions on activities of daily living, and activity limitations due to physical or mental health conditions. The variables that were found only in the 2011 survey included level of sedentary activities, and consultations about mental health with a health professional.

For descriptive and analytic purposes, responses to questions regarding health status, health related behaviours and chronic health indicators in the TS population compared to the control population were categorized as follows. The self-perceived health status variables were dichotomized as either being "good" (survey response 'excellent', "very good", or "good") or "fair/poor" (survey response "fair", or "poor"). Fruit and vegetable consumption was dichotomized as "less than 7 servings/day" or "7 servings/day or more" based on Canada Food Guide recommendations. Physical activity was categorized as "active/moderately active", or "inactive" based on total daily energy expenditure values (kcal/kg/day), calculated by CCHS. Total daily energy expenditures were calculated by the CCHS by asking respondents about their transportation and leisure time activities. Respondents were asked how often they engaged in a number of physical activities over a 12 month period and the average duration in hours of the activity. Energy expenditure was calculated using the frequency and duration per session of the physical activity as well as the MET (metabolic equivalent) value of the activity. Smoking status was categorized as being a "smoker/past smoker", or "non-smoker" while alcohol consumption in the past 12 months was categorized as "regular drinker/occasional drinker", or "non-drinker". For chronic health conditions, each condition (asthma, arthritis, back problems, high blood pressure, migraine, ulcer, bowel disorder, mood disorder, and anxiety) was dichotomized as "present" if the respondent replied that they had been diagnosed by a health professional with one of these disorders, or "absent" if not. Consultations about mental health was