Depression and Neurological Conditions in Canada

Rationale

Depression is defined as depressed mood or markedly diminished interest in almost all activities, accompanied by a number of physical and psychological symptoms (APA, 1994). Common features of depression include appetite changes, sleep changes, fatigue, difficulties with concentration, feelings of worthlessness or guilt, psychomotor agitation or retardation and suicidal thoughts, plans or attempts (APA, 1994). The estimated 12-month prevalence of depression is 7.4% (Patten et al., 2005), with a lifetime prevalence of up to 16.6% in adults over the age of 18 (Kessler et al., 2005).

Psychiatric comorbidities, particularly depression, represent a large burden for persons with neurological conditions and co-exist in up to 50% of patients (Fink et al., 2003). In multiple sclerosis patients, there is an estimated prevalence of depression of over 15% (Patten et al., 2003); women, persons under the age of 35 years and those with a family history of depression report a higher prevalence of depression (Patten et al., 2000). Persons with migraine report a higher prevalence of depression compared to the general population: the prevalence of migraine in females is 15.2% and males in 6.1% (Jette et al., 2008). The lifetime prevalence of depression in epilepsy has been reported to be over 17% in the Canadian general population (Tellez-Zenteno et al., 2007). A relationship with depression has also been shown in persons following a stroke, in those with dementia, Huntington's disease and amyotrophic lateral sclerosis (Salter et al., 2012; Vilalta-Franch et al., 2012; Reedeker et al., 2012; Oh, 2012).

The tools used to assess depression vary, from self-report of a physician diagnosis, semi-structured diagnostic interviews and a variety of depression-screening questionnaires. The heterogeneity in assessment tools makes the direct comparison of different prevalence estimates difficult and limited. The ascertainment method of the neurological condition is also different across studies with some using self-report and others using a clinical diagnosis from the medical chart. In addition, the populations used in these studies differ; some report estimates from the general population and others use clinical samples.

For the first time, data from a general population sample is available, using the same method of assessment for the neurological conditions (self-report of a physician diagnosis) and for depression (the PHQ-9). The Survey of Living with Neurologic Conditions in Canada (SLNCC) is a subset of the 2010 and 2011 Canadian Community Health Survey (CCHS). This subset represents those responders in the CCHS that indicated the presence of at least one neurological condition. The SLNCC is a nationally representative sample of over 5100 Canadians aged 15 and older with neurological conditions. Prevalence estimates of depression across numerous neurological conditions can now be directly compared in a general population sample.

We believe that depression data from the SLNCC will have a major impact on planning of health services for mental health in persons with neurological conditions and will also be important for setting the direction for future research in this area. If depression is more common in some of these conditions, resources devoted to its management in those conditions will need to

reflect this. Screening for depression may be an option for some of these conditions, but the effects of screening instruments (i.e. their positive predictive value) depend on base rates, which may or may not be different in these different populations. Finally, determining whether the conditions themselves are more or less strongly associated with depression after adjustment for demographic variables and other potential confounders may provide evidence of direct physiologic effects of the neurologic conditions, generating hypotheses for future research.

Research Questions

1. What is the prevalence of depression in all of the neurological conditions (as a group) assessed in the SLNCC overall?

2. What is the prevalence of depression in each of priority the neurological conditions assessed in the SLNCC?

3. Can differences in depression prevalence, if any, across various neurological conditions be accounted for by the differing age-sex distributions of these neurological conditions?

4. If elevated age and sex adjusted prevalence is found to differ between neurological conditions, do these differences persist with adjustment for (among others) health-related activity restrictions, general health, income and employment status?

Data Requirements

The proposed project will use the SLNCC. The data analysis will be conducted in STATA at the Prairie Regional Data Center at the University of Calgary.

Required Dataset

The SLNCC is a nationally representative, population-based survey of ~5,100 Canadians with at least one neurological condition. Data was collected from September 2011 to March 2012. The data provides a unique opportunity to determine the prevalence of depression across multiple neurological conditions using the same depression scale. The SLNCC contains a commonly used and validated instrument to assess depressive symptoms.

Key Variables

Demographic variables, including age, sex, education, marital status, and other variables, such as restriction of activities, general health, the health utility index, income and employment status, will be used to characterize the population.

Depression will be identified using the PHQ-9 (Kroenke, 2001), which assesses depressive symptoms over the previous two weeks. The PHQ-9 questions map directly onto the DSM-IV-TR (American Psychiatric Association, 1994) diagnostic criteria for a major depressive episode. The nine components of the questionnaire are: depressed mood, loss of interest and/or pleasure, sleep changes, decreased energy (fatigue), appetite changes, feelings of guilt or

worthlessness, difficulties with concentration and suicidal ideation. Each PHQ-9 item is scored from 0-3, with 0 indicating "Not at all", 1 "Several days", 2 "More than half the days", and 3 "Nearly every day" on how often a persons has been bothered by the nine symptoms listed above in the previous two weeks.

The priority neurological conditions (migraine, multiple sclerosis, epilepsy, cerebral palsy, spina bifida, hydrocephalus, muscular dystrophy, dystonia, Tourette's syndrome, Parkinson's disease, amyotrphic lateral sclerosis, Huntington's disease, Alzheimer's disease or dementia, stroke, brain or spinal cord tumor, spinal cord injury, brain injury) identified will be dichotomized to include only yes or no responses.

Data Analysis

The proposed project will employ various statistical methods, including descriptive statistics and proportions. Bootstrapping weights will be used where applicable to ensure applicability of findings to the general population where sampling occurred.

The PHQ-9 allows for algorithm scoring and cut-point scoring methods. In the algorithm scoring method, ≥ 5 symptoms must be present, of which at least one must be a cardinal symptom of depression (depressed mood or loss of interest/pleasure). A symptom is considered present if a score of ≥ 2 is indicated, except for suicidal ideation, where a score of ≥ 1 is sufficient. The cut-point scoring method uses the total score on the PHQ-9 to determine the presence of depression, with 10 of 27 being the threshold score. Both scoring methods will be employed in this study, in order to evaluate and help confirm the robustness of the findings.

Initially, the sample will be characterized using descriptive methods such as Tables and graphs. The demographic profile of each condition will be carefully examined.

1. The overall prevalence of depression, and 95% confidence intervals will be calculated.
2. The condition-specific prevalence, and 95% confidence intervals will be calculated.
3. A log-binomial model will be fit (a generalized linear model of the binomial family with the identity link function) predicting depression prevalence in relation to neurological conditions (represented using indicator variables). Age and sex and associated interaction terms will be added to this model one at a time in order to assess for effect modification by these variables and, in the absence of effect modification, to assess for confounding. These models will produce covariate-adjusted estimates of the neurological condition – depression association. A decision about whether specific conditions are more or less strongly associated with depression will be based on assessment of the point estimates and confidence intervals in these models, along with goodness of fit statistics (BIC, AIC) for models including indicator variables for all conditions, subsets of conditions or without distinctions between conditions.
4. The analysis described above will be extended by the addition of the other covariates listed above. We cannot asses the mediating role of these covariates using cross-sectional data, but a weakening of the association of a specific condition and depression following adjustment for those variables will generate hypotheses that these variables may act as mediators.

Rationale for Confidential Data Use

The public use microdata files may result in cell sizes that are too small for analysis once stratified by depression and age or sex. Also, to account for complexities in the study design, bootstrap weights will be employed, which are not available in the public data files. The age and sex distribution of neurological conditions varies widely, and these variables are strongly associated with depression prevalence. The value of this study will lie in its capacity to produce age and sex adjusted estimates, thereby facilitating unconfounded comparisons of the various conditions. Given the available sample size, it will be highly preferable to treat age as a continuous variable in the analysis. Models of the sort described will be extremely limited in their ability to adjust for age effects and to account for other covariates if it is necessary to include age categories. Access to continuous age requires access to the Master file data.

Expected Start and End Dates

The project is expected to start when the survey data is released and data access has been granted. The project will be completed within 6 months of that date.

Expected Products

The end goal of the proposed project is the publication of results in a peer-reviewed journal. It is expected that results may be presented at national or international psychiatry, neurology or epidemiology conferences.

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