Article

The household food insecurity gradient and potential reductions in adverse population mental health outcomes in Canadian adults

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ABSTRACT

Purpose: Household food insecurity is related to poor mental health. This study examines whether the level of household food insecurity is associated with a gradient in the risk of reporting six adverse mental health outcomes. This study further quantifies the mental health impact if severe food insecurity, the extreme of the risk continuum, were eliminated in Canada.
Methods: Using a pooled sample of the Canadian Community Health Survey (N = 302,683), we examined the relationship between level of food insecurity, in adults 18–64 years, and reporting six adverse mental health outcomes. We conducted a probit analysis adjusted for multi-variable models, to calculate the reduction in the odds of reporting mental health outcomes that might accrue from the elimination of severe food insecurity.
Results: Controlling for various demographic and socioeconomic covariates, a food insecurity gradient was found in six mental health outcomes. We calculated that a decrease between 8.1% and 16.0% in the reporting of these mental health outcomes would accrue if those who are currently severely food insecure became food secure, after controlling for covariates.
Conclusion: Household food insecurity has a pervasive graded negative effect on a variety of mental health outcomes, in which significantly higher levels of food insecurity are associated with a higher risk of adverse mental health outcomes. Reduction of food insecurity, particularly at the severe level, is a public health concern and a modifiable structural determinant of health worthy of macro-level policy intervention.

Introduction

Untreated mental health problems account for 13% of the total global burden of disease and depressive disorders are the third leading cause of disease burden worldwide (World Health Assembly, 2012). It has been estimated that by 2030 depressive disorders could represent the highest disease burden in the world (World Health Assembly, 2012). In Canada, mental health problems pose substantial direct and indirect costs on the lives of individuals and society (Deraspe, 2013). An estimated 20% of Canadians will experience a mental illness throughout the course of their lives (Smetanin et al., 2011), which can lead to short- and long-term productivity losses with serious consequences on public finances and lower government tax revenues. In addition, the costs associated with governmental financial assistance, public spending on health care and community support to address mental illness can place a major strain on the resources of the government. For example, approximately one third of hospital stays are due to mental disorders (Government of Canada, 2006) and it is estimated that the direct cost of mental ill health was $42 billion in Canada

in 2011 (Smetanin et al., 2011). Therefore, strategic spending on mental illness prevention and mental health promotion will promote population health, reduce the need for hospital admissions due to mental illness, and limit productivity declines, all of which would result in cost savings and a reduction in human suffering (Roberts & Grimes, 2011).

Poverty has long been associated with poor health outcomes including mental health outcomes. In Canada, individuals in the lowest income group are three to four times more likely to report their mental health as fair or poor compared with the highest income group (Statistics Canada, 2013). In addition, many cross-national and cross-sectional studies have shown that individuals with low-income or low socioeconomic status are at increased odds of reporting major depression (Lorant et al., 2003), mood disorders, anxiety disorder and substance abuse (Fryers, Melzer & Jenkins, 2003). Recently Burns (2015), stressed the need to disaggregate poverty into specific indicators such as, "income, expenditure, assets, education, employment and food security…" (p.108), in order to examine their distinct impact on mental health outcomes. This paper contributes to the literature by examining

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one of these indicators in greater detail—household food insecurity (HFI).

HFI is operationally defined as the lack of access to food because of financial constraints (Tarasuk, Dachner & Loopstra, 2014) and in Canada is measured through national survey responses to the Household Food Security Survey Module (HFSSM) (Bickel, Nord, Price, Hamilton & Cook, 2000; Health Canada, 2007). Using this metric, recent national estimates indicate that in 2012, 12.5% of Canadian households experienced some level of HFI (4.1% marginally food insecure, 5.7% moderately food insecure, and 2.7% severely food insecure) (Tarasuk, Mitchell & Dachner, 2014). The HFSSM is also the national measurement tool in the United States where the criterion for moderate food insecurity is one affirmative response more stringent, limiting direct comparability between studies using the same metric. Nevertheless, studies, which operationalize HFI using any classification system of the HFSSM by level or as a binary, have repeatedly shown that HFI has an impact on physical health and nutrition, including an increased risk of the development of chronic disease (Seligman, Laraia, & Kushel, 2010), poor self-rated health (Vozoris & Tarasuk, 2003), nutritional vulnerabilities in adolescents and adults (Kirkpatrick & Tarasuk, 2008), poor cardiovascular health (Saiz et al., 2016), diabetes (Gucciardi, Vogt, DeMelo & Stewart, 2009), oral health problems (Muirhead, Quiñonez, Figueiredo & Locker, 2009), anemia in children (Eicher-Miller, Mason, Weaver, McCabe & Boushey, 2009), and increased hospitalization (Cook et al., 2004). A growing body of evidence has also pointed to a detrimental association between HFI and mental well-being from a variety of settings and using variations on the scoring of the HFSSM (Carter, Kruse, Blakely & Collings, 2011; Davison & Kaplan, 2015; Davison, Marshall-Fabien, & Tecson, 2015; Fuller-Thomson & Nimigon, 2008; Heflin, Siefert, & Williams, 2005; Leung, Epel, Willett, Rimm & Laraia, 2015; Muldoon, Duff, Fielden & Anema, 2013; Whitaker, Phillips, & Orzol, 2006; Pryor et al., 2016; Siefert, Heflin, Corcoran & Williams, 2004; Stuff et al., 2004; Tarasuk, Mitchell, McLaren & McIntyre, 2013; Vozoris & Tarasuk, 2003; Wu & Schimmele, 2005). It is hypothesized that HFI impacts mental health due to the unique stresses associated with the biological and social implications of "not having enough money for food" (Health Canada, 2007, p.45), which is the common end to each HFSSM question (Bhattacharya, Currie, & Haider, 2004; Hadley & Crooks, 2012).

The evidence presented supports the reasoning for HFI being considered one of 14 social determinants of health in Canada (Raphael & Mikkonen, 2010), or a factor apart from medical care that can shape health in a powerful way (Braveman & Gottlieb, 2014). Importantly, population health researchers emphasize that health risk does not often occur as two extremes of exposure but rather as a continuum of risk (Institute of Medicine, 2003). Therefore, population-based interventions focus on shifting the risk curve for an entire population while paying attention to the social conditions that characterize individual lives (Marmot et al., 2008; Halfon, Larson, & Russ, 2009).

The majority of the research conducted on the association between mental health outcomes and HFI has been conducted using a binary measure of food insecurity (Carter et al. 2011; Fuller-Thomson & Nimigon, 2008; Vozoris & Tarasuk, 2003), despite the established predictive power of a three-level (food secure, moderately food insecure and severely food insecure) or four-level (food secure, marginally food insecure, moderately food insecure and severely food insecure) HFI measure on mental health outcomes (Burke, Martini, Çayir; Hartline-Grafton & Meade, 2016; Cook et al., 2004; Davison, et al., 2015; Muldoon et al., 2013; Pryor et al., 2016; Tarasuk et al., 2013; Whitaker et al., 2006). A binary measure treats food insecure respondents as one homogenous group and thus disguises important health outcomes associated with different severities of HFI (Burke et al., 2016; Tarasuk et al., 2015). For example, Burke and associates observed that a three-level measure of HFI severely was positively associated with mental health outcomes in children and adolescents in the United

States, using a slightly more stringent criterion for moderate food insecurity compared with Canada (Burke et al., 2016). In addition, in Canada Tarasuk and colleagues showed increasing health care costs (including psychiatric care and prescription drug costs) with increasingly severe HFI, using a four-level variable (Tarasuk et al., 2015). These studies present the idea that HFI could be having a graded, or step-wise, impact on mental health outcomes. The present study contributes to the literature by analyzing the relationship between a four-level HFI variable and six adverse mental health outcomes in Canadian adults.

The objectives of this study are specifically to: 1) determine whether increasing levels of HFI are associated with higher risk of reporting adverse mental health outcomes (i.e., does an HFI gradient exist on six mental health conditions?); and 2) quantify the reduction in the reporting of mental health outcomes that could be expected if severe HFI were eliminated in Canada, i.e., if the risk curve were shifted to less severe HFI.

Methods

Data source

We pooled 4 cycles (Cycle 3.1 [2005], 2007–2008, 2009–2010, and 2011–2012) of the Canadian Community Health Survey (CCHS). The CCHS is a series of cross-sectional surveys structured to collect information on a variety of issues relating to health, including health status, health care utilization, and health determinants (Statistics Canada, 2007). The target population, sampling procedure, and sample sizes are all determined by Statistics Canada. These surveys are divided by health region and reflect estimates according to health region and province as well as the Canadian population as a whole. The CCHS collects data from any person aged 12 or older residing in a dwelling in the ten provinces and three territories. Individuals living on reserves or Crown land, in institutions, in remote regions, or who are members of the Armed Forces are not included in the survey. The CCHS data sample represents approximately 98% of the Canadian population aged 12 years or older.

Cycles were combined with the existing weights (survey weights), divided by four (the number of cycles pooled) and the pooled dataset[1] was treated as one sample from a single population with a sample size of N = 515,421 prior to exclusions.

The CCHS questions are designed for computer-assisted interviewing (CAI) with pre-programmed questions, content flow, and allowable responses (ranges or answers). Half of the interviews take place by telephone while the other half take place as personal interviews; participation in the CCHS is voluntary and responses are kept strictly confidential (Statistics Canada, 2007).

Exclusion criteria

The population of interest is working-age Canadian adults (18–64 years). Children aged 12–17 years were excluded from the dataset as adult members of a household will often protect children in that household from more severe food insecurity (Roshanafshar & Hawkins, 2015). As a result, the children's level of HFI may not accurately reflect the real lived experience of food insecurity for that child, who may still feel the shame, distress and frustration related to food insecurity (Roshanafshar & Hawkins, 2015). Respondents 65 years and over were excluded because seniors in Canada receive guaranteed monthly income in the form of a seniors pension therefore they have the lowest

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[1] Pooling CCHS data requires that three assumptions be met: the same characteristics must be assessed from cycle to cycle, the same population must be targeted across cycles, and the "mode effect" (that the same method of data collection must occur across cycles) (Thomas & Wannell, 2009). All three of these assumptions were met in this analysis.