



The association of food security with psychological distress in New Zealand and any gender differences

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ABSTRACT

Food security (access to safe, nutritious, affordable food) is intrinsically linked to feelings of stress or distress and it is strongly associated with socioeconomic factors. However, the impact of food insecurity on mental health, independent of confounding socioeconomic factors, is not clear. We investigated the association of food insecurity with psychological distress in New Zealand, controlling for socioeconomic factors. Secondly, we examined the association in males and females. We used data from the Survey of Families, Income and Employment (SoFIE) ($N = 18,955$). Respondents were classified as food insecure if, in the last 12 months, they: used special food grants/banks, had to buy cheaper food to pay for other things, or went without fresh fruit and vegetables often. Psychological distress was measured using the Kessler-10 scale dichotomised at low (10–15) and moderate to high (16+). Logistic regression analyses were used to investigate the association of food insecurity with psychological distress using a staged modelling approach. Interaction models included an interaction between food security and gender, as well as interactions between gender and all other covariates (significant at p -value < 0.1). Models were repeated, stratified by gender.

A strong relationship between food insecurity and psychological distress was found (crude odds ratio OR 3.4). Whilst substantially reduced, the association remained after adjusting for confounding demographic and socioeconomic variables (adjusted OR 1.8). In stratified models, food insecure females had slightly higher odds for psychological distress (fully adjusted OR 2.0) than males (fully adjusted OR 1.5). As such, an independent association of food insecurity with psychological distress was found in both males and females – slightly more so in females. However, we cannot rule out residual confounding as an explanation for the independent association and any apparent gender interaction.

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Introduction

Basic necessities such as adequate food, clothing and housing are fundamental to a person's wellbeing (Ministry of Social Development, 2008). Food security is defined as the assured ability to acquire nutritionally adequate and safe food that meets cultural needs, and has been acquired in a socially acceptable way (Bowers et al., 2009; Carter, Lanumata, Kruse, & Gorton, 2010b; Parnell, Reid, Wilson, McKenzie, & Russell, 2001; Rush & Rusk, 2009). Conversely, food insecurity exists largely as a consequence of limited resources, a problem affecting many households worldwide and in New Zealand (NZ) (Alaimo, 2005; Carter et al., 2010b;

Hamelin, Beaudry, & Habicht, 2002; Parnell et al., 2001; Russell, Parnell, & Wilson, 1999; Stuff et al., 2004; Tarasuk, 2005; Vozoris & Tarasuk, 2003). Food security not only influences nutrition and physical health, but it may also affect a person's mental health. Food insecure individuals may experience psychological distress as a result of lack of access to nutritious, affordable, culturally appropriate food and the inability to feed themselves and their families.

This paper aims to determine the association between food security and psychological distress and whether the association persists after controlling for confounding by demographic and socioeconomic factors. We also examine if this association differs by gender. The introduction to this paper is structured as follows. Firstly we describe food security in NZ and other developed countries. Then we discuss the potential impacts of food security on mental health and how this may be confounded by socioeconomic

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factors. Finally, we discuss how the association of food security with mental health may differ by gender and how this may be due to different gender mechanisms or to differential error and confounding by gender.

The determinants of food security

Despite relatively high standards of living, food insecurity occurs even in developed countries that have an ample supply of food (Riches, 1999). In NZ, 13% of households reported that they can only sometimes afford to eat properly and 14% reported that food runs out in the household because of money (“sometimes” 12% and “often” 2%) (Russell et al., 1999). Similar rates of food insecurity have been found in the United States and Canada (10%–12%) (Che & Chen, 2001; Nord, Andrews, & Carson, 2009; Whitaker, Phillips, & Orzol, 2006). It has been shown that women tend to report food insecurity more often than men (Alaimo, Briefel, Frongillo, Jr., & Olson, 1998; Hamelin et al., 2002; Kaiser, Baumrind, & Dumbauld, 2007; Nord et al., 2009; Russell et al., 1999; Tarasuk, 2005; Temple, 2008). Ethnicity is also strongly associated with food security. In NZ, more Māori (indigenous population) and Pacific (mostly post World War II migrants from Pacific Islands) households reported that they could only sometimes afford to eat properly, as compared to households of European or other descent (29%, 38%, and 10%, respectively) (Russell et al., 1999). In the U.S., Hispanics and African Americans are more likely to report food insecurity than Caucasians (Alaimo et al., 1998; Kaiser et al., 2007; Laraia, Siega-Riz, Gundersen, & Dole, 2006).

Although there are a number of different measures of food insecurity used worldwide, each measure similar constructs of lack of food due to economic deprivation (Innes-Hughes, Bowers, King, Chapman, & Eden, 2010; Keenan, Olson, Hersey, & Parmer, 2001; Radimer, 2006; Tarasuk, 2005). Hence, food security has been shown to be strongly associated with income and the accessibility of material resources within households. Many studies have shown a strong association between income and food security (Che & Chen, 2001; Collins, 2009; Hamelin et al., 2002; Kaiser et al., 2007; Laraia et al., 2006; Nord et al., 2009; Temple, 2008). In the U.S., food insufficiency (a more extreme form of food insecurity which relates to hunger) was primarily determined by poverty (Alaimo et al., 1998). In NZ, food insecurity is more prevalent in low income households, among those living in deprived neighbourhoods (Russell et al., 1999), and in households with five or more children (Ministry of Health, 2003). These findings are consistent with those in other developed countries (Alaimo et al., 1998; Nord et al., 2009; Tarasuk, 2005).

Food security and mental health

Food insecurity is associated with many adverse health outcomes. Insufficient food or a lack of nutritious foods can lead to inadequate nutrition, resulting in compromised intakes of energy and nutrients (Kendall, Olson, Frongillo, & Jr., 1996; Olson, 2005; Rose & Oliveira, 1997; Tarasuk & Beaton, 1999); lower physical performance (Klesges et al., 2001); multiple chronic conditions, and obesity (Che & Chen, 2001). Subjective well-being and self-rated health are also compromised by food insecurity. Individuals who lack adequate access to food more often report fair or poor health status, compared to those who are food secure (Stuff et al., 2004; Temple, 2008; Vozoris & Tarasuk, 2003).

In addition to physical health outcomes, mental health can also be affected by food insecurity. A number of studies report an association of food insecurity with mental disorders such as depression (Casey et al., 2004; Heflin, Siefert, & Williams, 2005; Klesges et al., 2001; Laraia et al., 2006; Temple, 2008; Vozoris &

Tarasuk, 2003; Whitaker et al., 2006), distress (Vozoris & Tarasuk, 2003), anxiety (Siefert, Heflin, Corcoran, & Williams, 2004; Whitaker et al., 2006), and lower scores on Physical and Mental Health (SF-12) scores (Stuff et al., 2004). In NZ, 12% of households said that they were sometimes or often stressed about not having enough money for food (Russell et al., 1999). A longitudinal study of female welfare recipients in the U.S. used fixed effects analysis (controlling for within-individual variation and temporal changes in other factors such as family status and socioeconomic measures) and found that the odds of becoming depressed doubled as a result of becoming food insecure (Heflin et al., 2005; Siefert et al., 2004). The correlation between food security and mental health has also been established in many developing countries (Hadley & Patil, 2006; Hadley et al., 2008; Maes, Hadley, Tesfaye, & Shifferaw, 2010; Roberts, Ocaka, Browne, Oyok, & Sondorp, 2009).

We argue that socioeconomic status (SES) may confound the relationship between food insecurity and mental health, as strong socioeconomic disparities have been shown across a number of mental disorders (Dohrenwend et al., 1992; Fryers, Melzer, & Jenkins, 2003; Muntaner, Eaton, Miech, & O'Campo, 2004; Skapinakis, Weich, Lewis, Singleton, & Araya, 2006). Income has a strong (inverse) dose-response relationship with mental health and psychological well-being (Hauck & Rice, 2004; Kaplan, Shema, & Leite, 2008). Similarly, a decrease in the material standard of living over time is associated with an increase in depressive symptoms as well as caseness of major depression (Lorant et al., 2007). This association holds in NZ, where nearly half of the population experiences a mental disorder at some point in their lives, and the 12-month prevalence of disorders is higher for people with lower income or education levels or living in highly deprived areas (Oakley Browne, Wells, & Scott, 2006).

Taking this information together, SES is an important confounder of the food security-mental health relationship. Therefore, we aim to examine the effects of controlling for various measures of SES on the relationship between food security and mental health. We hypothesize that most of the association will be explained by including different measures of adult SES and deprivation to the model. This investigation is important for policy development around food security and welfare in developed countries. If the relationship is mostly explained by, for example, household income, then policy around raising the levels of resources in low income and beneficiary households and moving households and families out of poverty should be further prioritised, as opposed to any policy development specifically addressing mechanisms in any causal pathway from food insecurity to psychological distress.

Gender differences in food security and mental health

Assuming at least some causal relationship between food insecurity and mental health exists, several explanations have been posited as mechanisms for this relationship. Firstly, physical health may mediate the relationship, such that food insecurity could negatively affect physical health, which in turn influences mental health (Collins, 2009; Siefert et al., 2004). Secondly, food insecurity may act as a stressor in women, where individuals may feel that they are not successful if they cannot procure adequate amounts of food (Collins, 2009; Siefert et al., 2004). Related to this mastery, the sense of control over one's life, may mediate the relationship of food security with depression in women only (Siefert et al., 2004). This hypothesis is supported by the evidence that belief in external control (a low level of mastery) is associated with low SES, which is a strong predictor of food insecurity (Leach, Christensen, Mackinnon, Windsor, & Butterworth, 2008) and may therefore serve as a link between food security and mental health. It has also been shown that mastery, along with other psychosocial factors,

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