

PSYCHOLOGICAL DISTRESS AND SEASONAL AFFECTIVE DISORDER AMONG URBAN ABORIGINAL PARTICIPANTS

Benita Y. Tam
William A. Gough

ABSTRACT

The prevalence of psychological distress and seasonal affective disorder (SAD) was examined in an urban Aboriginal population sample and an urban non-Aboriginal population sample through the use of a modified 12-item General Health Questionnaire (GHQ-12) and the Seasonal Pattern Assessment Questionnaire (SPAQ). Compared to non-Aboriginal participants (n=49), urban Aboriginal participants (n=43) were approximately three times more likely to exhibit psychological distress, and approximately four times more likely to exhibit SAD. Participants who perceived their health as poor/fair were also more likely to exhibit psychological distress. These findings provide a greater understanding of the mental health status of an urban Aboriginal group; further research is required with a larger sample size.

Keywords: Aboriginal people; urban; psychological distress; seasonal affective disorder; health status; Canada

INTRODUCTION

The World Health Organization (WHO) estimates that over 100 million people are afflicted with a chronic mental health condition such as depression (WHO, 2010). Seasonality, described as seasonal variation in behaviour and mood, is also prevalent among the general population (Bartko and Kasper, 1989; Han et al., 2000). However, the level of risk to affective disorders differs among various types of populations. In particular, vulnerable populations, including Aboriginal¹ groups, are at greater risk for mental disorders (Beiser and Stewart, 2005; Bowen et al., 2009; Laliberté and Tousignant, 2009; Leenaars, 2006; WHO, 2010). In Australia, Aboriginal people were more likely to be hospitalized for a mental illness than non-Aboriginal people. Aboriginal Australians were at least 2 times more likely to be “hospitalized for intentional self-harm” and exhibit signs of psychological distress than non-Aboriginals (Pink and Allbon, 2008). In Canada, the suicide rate of Aboriginal peoples (Métis, Inuit, and First Nations) is 3 times that of non-Aboriginal peoples (Kirmayer, 1994). For off-reserve locations, Aboriginals were 1.3 to 1.5 times more likely to experience a major episode of depression than non-Aboriginals (Tjepkema, 2002). In British Columbia, Canada, nearly 10% of the Aboriginal population were on antidepressants (Wardman and Khan, 2004). On the other hand, not all Aboriginals are equally at risk to mental issues. The First Nations Regional Health Survey found that those (First Nations living on reserve) who completed their high school education were less at risk for distress (First Nations Information Governance Centre [FNIGC], 2012).

Acknowledgments: This study was supported by the McMaster University Indigenous Health Research Development Program Research Allowance, funded by the Canadian Institutes of Health Research –Institute of Aboriginal People’s Health; and Social Sciences and Humanities Research Council of Canada. We appreciate the support and advice from Drs. Kathi Wilson, Clare Wiseman, and Sharon Cowling of the University of Toronto. Furthermore, we gratefully thank the involvement of the urban Aboriginal community in Toronto. We thank the participants of the study, and appreciate the support from Warren Canney, Wigwamen Inc.

¹ Aboriginal refers to those whose ancestors were native inhabitants of a place.

Mental distress, defined as a nonspecific psychiatric disorder, is characterized by symptoms such as anxiety, depression, stress, sadness, dread, irritability, anger, and hopelessness (Dohrenwend et al., 1980; Ilfeld, 1976). The root origins of mental health issues are complex, and they are often related to coincident social issues such as domestic violence, suicide, and/or substance abuse (Kirmayer et al., 1994; MacMillan et al., 1996; Yang et al., 2006). Psychiatric disorders may provoke social problems, or alternatively, social problems may be the root cause of psychiatric disorders (Kirmayer et al., 1994). Yang et al. (2006) found that Aboriginal women of Taiwan were more likely to exhibit signs of depression and suicidal inclination if they were physically or sexually abused in the past. In Canada, cumulative effects of acculturation and colonialism have been delineated as the root sources of the high occurrence of mental and social problems among Aboriginal peoples (Bourassa et al., 2005; King et al., 2009; Kirmayer et al., 2003; Reading and Wien, 2009). Examples of such issues include, homelessness, alcoholism, family conflict, sexual abuse, housing challenges, and unemployment (Kirmayer et al., 2003; Laliberté and Tousignant, 2009).

SAD, depression, and anxiety are frequently reported in northern communities (McGrath-Hanna et al., 2003). Seasonal affective disorder (SAD) is a clinical condition where symptoms such as depression and fluctuations in appetite, sleep activity, weight, and energy level are associated with seasonal change (Rosenthal et al., 1987). The etiology of SAD has been associated to limited exposure to solar radiation, melatonin level, and circadian rhythm disturbance; though these associations have been debated (Lam and Levitt, 1999). Studies have argued that decreased exposure to sunlight (e.g., due to higher latitudes or winter season) affects the secretion of melatonin (Broadway et al., 1987; Lewy et al., 1980). Melatonin is a hormone secreted from the pineal gland of the brain that helps regulate circadian rhythm of body temperature and sleep activity (Cagnacci et al., 1992). It is argued that an excess secretion of melatonin disturbs the circadian rhythm, causing changes in physiological functions and mood (Germain and Kupfer, 2009; Healy, 1987;

Wehr et al., 1983). Other studies, however, have found no significant relationship between melatonin and SAD (Checkley et al., 1993; Eastman et al., 1993; Partonen et al., 1996; Partonen et al., 1997; Rice et al., 1995).

Studies examining the prevalence of SAD among Aboriginal communities focus mainly in northern regions. In an Inuit community in Canada, Haggarty et al. (2002) found that 22.6% of the sample were depressed, of which 6.3% were afflicted with SAD. A study conducted in Alaska found no significant difference in the occurrence of SAD between Alaskan Natives and non-Natives (Booker and Hellekson, 1992). In Finnish Lapland, Saarijarvi et al. (1999) compared seasonality between the Sami people (i.e. Lapps — an Arctic Indigenous group) and the Finns (those native to Finland). The Finns were found to be significantly more likely to exhibit SAD than the Lapps (Saarijarvi et al., 1999). To our knowledge, literature on SAD specifically focusing on Aboriginal populations in southern communities (e.g. mid-latitudes) is limited.

Current literature on the mental health of urban Aboriginal groups is also limited. As the Aboriginal population living in urban centres has significantly increased over recent decades (Eades et al., 2010; Siggner and Costa, 2005), with 54% of the Aboriginal population in Canada living in urban centres (Statistics Canada, 2008) and 53% of the Aboriginal population in Australia living in major cities/regional centres (Australian Bureau of Statistics, 2007) in 2006, it was of interest to study an urban Aboriginal group. To our knowledge, there has not been a study comparing the occurrence of SAD between an urban Aboriginal population and a non-Aboriginal population. As Aboriginal peoples in Canada are at heightened risk for health disparities (Stout and Kipling, 2002), we wanted to compare the occurrence of SAD and psychological distress in an urban Aboriginal sample and in a non-Aboriginal sample in a specific urban location. The present study examined the prevalence of SAD and psychological distress through the use of the Seasonal Pattern Assessment Questionnaire (SPAQ) and a modified 12-item General Health Questionnaire (GHQ-12). Understanding the significance of psychological dis-

tress and SAD among the urban Aboriginal population provides a greater understanding of their mental well-being and whether an urban group faces similar health risks as rural Aboriginal groups.

The goals of the study were to compare the general well-being and occurrence of seasonal affective disorder and psychological distress in an urban Aboriginal sample and in a non-Aboriginal sample, examining the population in Toronto, Ontario, as a case study; and to identify any other factors that may contribute to the risk of seasonal affective disorder and emotional distress. As off-reserve Aboriginal people (living in cities and towns) are more likely to be afflicted with a mental illness than non-Aboriginal people, a comparative approach was used to explore whether an urban Aboriginal group is also at greater risk for psychological distress and seasonal affective disorder than an non-Aboriginal urban group.

MATERIALS AND METHODS

PARTICIPANTS

In Canada, the majority of Aboriginal households were located in urban centres in 2001 (Jakubec and Engeland, 2004). Between 2001–2005, the Aboriginal population in the City of Toronto increased by 31%, where the Aboriginal population comprised 0.5% of Toronto's total population (M.-F. Germain et al., 2009). In 2006, the total Aboriginal population living in Canada was 1,172,790 people, with a total of 26,575 Aboriginal people living in Toronto (M.-F. Germain, et al., 2009). This study included a total of 92 participants (Aboriginal participants, n=43; non-Aboriginal participants, n=49) from the vicinity of Toronto. Aboriginal participants were between the ages of 19–65 (mean=41.6, standard deviation [SD]=13.0); and non-Aboriginal participants were between the ages of 22–87 (mean=42.8, SD=17.7). There were 26 female and 17 male Aboriginal participants, and 32 female and 17 male non-Aboriginal participants. Recruitment of participants occurred in 2010 and 2011. Aboriginal participants were recruited by advertisements posted in Aboriginal centres located in Toronto, by email sent through listservs of various Aboriginal organizations in Toronto, and by snowball sampling. Non-Aboriginal partici-

pants were recruited by advertisements posted in various public and private establishments and institutions (e.g., community centres, commercial centres, libraries), and by snowball sampling. The survey was administered either through email or in person. While some non-Aboriginal participants chose to complete the survey via email, all Aboriginal participants completed the survey in person. For Aboriginal participants, the study requirements were that the participant had to self-identify as Aboriginal, be 18 years of age or older, and have lived in Toronto for the last three years or more. For non-Aboriginal participants, the study was limited to those who were 18 years of age or older and had lived in Toronto for the last three years or more. A minimum of three years residence was established to ensure that the participant had adequate exposure to the climate of Toronto; this was also an eligibility requirement in a study on SAD by Booker and Hellekson (1992). Ethical approval was obtained from the University of Toronto Research Ethics Board.

HEALTH OUTCOME MEASURES

A survey was administered to the participants. The goal of the survey was to collect information on current health status and risks for SAD and distress. The survey included three health metrics: 1) the self-rated health question; 2) GHQ-12; and 3) SPAQ. In the survey, participants were also asked to indicate their date of birth, ethnicity, gender, weight, and height (to calculate body mass index [BMI]), current health conditions/ailments, length of time residing in the area, whether they experience stress, and (if yes) whether climate is a relevant factor to stress.

The self-rated health question

The self-rated health question is a health metric used to examine the health status of a person. Participants are asked to rate their own health, choosing one of the following categories: poor, fair, good, very good, or excellent. This question is widely used and has been found to be a valid health measure in determining overall health status for different types of populations (Chandola and Jenkinson, 2000). It has also been found to be an accurate predictor of mortality (Idler and Benyamini, 1997; Mossey and Shapiro, 1982).

12-item General Health Questionnaire (GHQ-12)

The GHQ-12 was administered to measure psychological distress. The GHQ-12 is a self-reported questionnaire used to assess whether a person is experiencing psychological distress (Goldberg, 1985). The GHQ-12 is commonly used as a general screening instrument for symptoms of psychiatric disorders such as anxiety, depression, social dysfunction, and emotional distress. The GHQ-12 is well-validated and reliable (Goldberg et al., 1997; Salama-Younes et al., 2009; Sanchez-Lopez and Dresch, 2008), and highly comparable to longer versions of the GHQ, e.g. 30-Item General Health Questionnaire (GHQ-30) and 60-Item General Health Questionnaire (GHQ-60) (Goldberg et al., 1997).

The GHQ-12 includes six positive items (being able to concentrate, playing a useful part in things, capable of making decisions, able to enjoy day-to-day activities, able to face up to problems, and feeling reasonably happy) and six negative items (lost sleep over worry, feeling constantly under strain, can't overcome difficulties, feeling unhappy or depressed, losing confidence, and feeling worthless). For each item, participants were required to choose one response, which was scored on a binary scale: 0-0-1-1. For positive items, response categories include "better than usual" (score=0), "same as usual" (score=0), "less than usual" (score=1) and "much less than usual" (score=1). For negative items, response categories include 'not at all' (score=0), 'no more than usual' (score=0), 'rather more than usual' (score=1) and 'much more than usual' (score=1). A total score was then tallied (possible total score=0-12).

For a person to be classified with a positive case of distress (case classification), his/her total score must be 4 or more (threshold for case classification). Goldberg et al. (1988) compared the use of various thresholds and concluded that for a mean score above 2.7 (of the total sample), the threshold should be 4 or more (Bodsworth et al., 2011). For this study, the mean score of the total sample=3.35.

For this study, the GHQ-12 was modified by omitting one item (item 11 – "feeling worthless"); resulting in a possible total score of 11. Survey questions, including those from the GHQ-12, were vetted through an expert in Aboriginal research. As

suicide rates are high among the Aboriginal population (Kirmayer, 1994; Laliberté and Tousignant, 2009; Leenaars, 2006), there was concern that this particular question (item 11) would instigate suicidal thoughts. Other studies have utilized a modified version of the GHQ by abstracting items from the questionnaire or by removing certain items (Ferrie et al., 2007; Suhail et al., 2009; Vaananen et al., 2003; Wahlström et al., 2009).

Seasonal Pattern Assessment Questionnaire (SPAQ)

To measure SAD, the SPAQ was used. The SPAQ is a self-reported questionnaire that is commonly used as a screening instrument for SAD (Rosenthal et al., 1987). The prevalence of SAD has been examined through the use of the SPAQ on a variety of populations in a number of countries including Alaska, Australia, Canada, China, Finland, Korea, and United States (Booker and Hellekson, 1992; Murray, 2004; Jang et al., 1997; Levitt et al., 2000; Han et al., 2000; Pajunen et al., 2007; Choi et al., 2011; Bartko and Kasper, 1989). The SPAQ assesses seasonal change in sleep, social activity, mood, weight, appetite, and energy level. First, respondents score the level of change for each item from 0-4 (0=no change, 1=mild change, 2=moderate change, 3=marked change, and 4=extreme change). The sum of scores (possible total score=0-24) indicates their global seasonality score (GSS). Second, respondents indicate which months these behaviour items are at a high/low point ("which months do you feel the worst?"). Third, the SPAQ assesses seasonal fluctuation in food preference (no or yes), sleep length, and weight (0-3 pounds [lbs], 4-7 lbs, 8-11 lbs, 12-15 lbs or over 15 lbs). Fourth, the respondent indicates whether seasonal change is a problem on a scale from 0-5 (0=none, 1=mild, 2=moderate, 3=marked, 4=severe, and 5=disabling). For a respondent to be screened positive for SAD, the GSS score must be a total of 11 or greater, and seasonal change must be a score of 2 or greater (Rosenthal et al., 1987).

STATISTICAL ANALYSIS

Health outcomes of the study were distress (GHQ-12) and SAD (SPAQ). First, means scores of GHQ-12, GSS, and SPAQ items were compared between Aboriginal and non-Aboriginal participants through

an analysis of variance (ANOVA) and chi-square tests.

Second, logistic regression analyses were performed to determine the association between background (Aboriginal vs. non-Aboriginal) and distress (GHQ-12), and the association between background and SAD (SPAQ). Independent variables include age group (20-35 vs. 36-55 vs. >55 y.o.); gender (female vs. male); body mass index (BMI) (under/normal vs. overweight vs. moderate/severely obese); weight fluctuation (0-11 vs. >11 lbs), self-assessed health (poor/fair vs. good/very good/excellent); health issues (none vs. at least one); seasonal change in food preference (no vs. yes); stress (no vs. yes); climate-related stress (no vs. yes); sleep length in winter (≤ 8 vs. > 8 hours [hrs]); sleep length in spring (≤ 8 vs. > 8 hrs); sleep length in summer (≤ 8 vs. > 8 hrs); and sleep length in fall (≤ 8 vs. > 8 hrs). To determine the final model, a backward elimination approach was employed. Due to the small sample size and numerous independent variables, subsets selection and combined forward-backward step-wise selection approaches were also employed to confirm the final model.

A modified version of the GHQ-12 was used for the present study. Because of this, it was important to assess the internal consistency of the modified GHQ-12 to determine its reliability; thus, the Cronbach's alpha value of the modified GHQ-12 was calculated. A Cronbach's alpha value of ≥ 0.7 is considered acceptable, ≥ 0.8 is good, and ≥ 0.9 is excellent (George and Mallery, 2003). A probability (p) value of 0.05 or less was considered statistically significant. All statistical analyses were performed using SAS (version 9, SAS Institute Inc.).

RESULTS

GHQ-12 and SPAQ results are shown in Table 1, significant logistic regression results are shown in Table 2, and health and sociodemographic data of the subject groups are shown in Table 3. The modified GHQ-12 exhibited a high internal consistency with a Cronbach's alpha of 0.92. This is in agreement with other

studies that have examined the internal consistency of the GHQ-12 and found a Cronbach's alpha above 0.8 (Doi and Minowa, 2003; McCabe et al., 1996).

There was a significantly higher occurrence of psychological distress among Aboriginal participants (46.5%) than non-Aboriginal participants (24.5%) (Table 1). Aboriginal participants scored a significantly higher GHQ-12 mean total than non-Aboriginal participants (Table 1); and compared to non-Aboriginal participants, Aboriginal participants were approximately three times more likely to exhibit psychological distress (OR 2.98, 95% CI 1.16-7.64) (Table 2). Participants who reported their health as poor/fair were more likely to experience psychological distress than those who reported their health as good/very good/excellent (Table 2).

SAD was significantly more prevalent among Aboriginal participants (n=18 [42%]) than non-Aboriginal participants (n=6 [12%]) (Table 1). The majority of Aboriginal participants indicated that seasonal change was a moderate to disabling problem

Table 1 GHQ-12 and SPAQ Results Comparing Aboriginal vs. Non-Aboriginal Participants

Item	Category	Aboriginal (n=43)	Non-Aboriginal (n=49)	p-value
GHQ-12, n (%)	Not distressed	23 (53.5)	37 (75.5)	<0.05 ^a
	Distressed	20(46.5)	12 (24.5)	
GHQ-12 total score, mean (SD)		4.5 (± 3.7)	2.4 (± 3.5)	<0.01 ^b
SPAQ, n (%)	No SAD	25 (58)	43 (88)	<0.001 ^a
	SAD	18 (42)	6 (12)	
Seasonal changes, n (%)	None/mild	17 (40)	30 (61)	<0.05 ^a
	Moderate/ marked/ severe/ disabling	26 (60)	19 (39)	
SPAQ items (maximum possible=4)	Sleep, mean (SD)	2.0 (± 1.3)	1.1 (± 0.9)	<0.001 ^b
	Social activity, mean (SD)	2.2 (± 1.2)	1.6 (± 1.2)	<0.05 ^b
	Mood, mean (SD)	2.2 (± 1.3)	1.7 (± 1.1)	=0.057 ^b
	Weight, mean (SD)	1.3 (± 1.2)	1.1 (± 1.2)	=0.533 ^b
	Appetite, mean (SD)	1.4 (± 1.3)	1.4 (± 1.1)	=0.84 ^b
	Energy level, mean (SD)	2.3 (± 1.2)	1.8 (± 1.0)	<0.05 ^b
	GSS score (maximum possible=24), mean (SD)	11.3 (± 5.8)	8.6 (± 5.2)	<0.05 ^b
Seasonal change ^c , mean (SD)		2.0 (± 1.6)	1.3 (± 1.3)	<0.05 ^b

^aChi-square test.

^bANOVA.

^cRating of whether seasonal change is a problem.

Table 2 Logistic Regression Results for GHQ-12 and SPAQ

Variable	GHQ-12			SPAQ		
	Odds Ratio	95% Confidence Interval	p-value	Odds Ratio	95% Confidence Interval	p-value
Background (Aboriginal vs. non-Aboriginal)	2.98	1.16-7.64	<0.05	3.84	1.33-11.08	<0.05
Self-assessed health (poor/fair vs. good/very good/excellent)	7.97	2.27-28.0	<0.01	–	–	–

Table 3 Health and Sociodemographic Data of Aboriginal and Non-Aboriginal Participants

Item	Category	Aboriginal	Non-Aboriginal	p-value
Gender, n(%)	female	26 (60)	32 (65)	=0.631 ^a
	male	17 (40)	17 (35)	
Age, mean (±SD)		41.6 (±13)	42.8 (±17.7)	=0.720 ^b
Age group, n (%)	20-35	15 (35)	23 (47)	<0.05 ^a
	36-55	21 (49)	12 (24)	
	> 56	7 (16)	14 (29)	
BMI, n (%)	under/normal	20 (48)	30 (61)	=0.284 ^a
	overweight	12 (29)	13 (27)	
	moderate/severely obese	10 (24)	6 (12)	
Weight fluctuation, n (%)	0-11 lbs	31 (74)	43 (88)	=0.088 ^a
	> 11 lbs	11 (26)	6 (12)	
Food preference, n (%)	No	19 (44)	13 (27)	=0.076 ^a
	Yes	24 (56)	36 (73)	
Sleep length in winter, n (%)	≤ 8 hours	23 (53)	42 (86)	<0.001 ^a
	> 8 hours	20 (47)	7 (14)	
Sleep length in spring, n (%)	≤ 8 hours	30 (70)	45 (92)	<0.01 ^a
	> 8 hours	13 (30)	4 (8)	
Sleep length in summer, n (%)	≤ 8 hours	30 (70)	40 (82)	=0.183 ^a
	> 8 hours	13 (30)	9 (18)	
Sleep length in fall, n(%)	≤ 8 hours	25 (58)	44 (90)	<0.001 ^a
	> 8 hours	18 (42)	5 (10)	
Stress, n (%)	No	6 (14)	7 (14)	=0.964 ^a
	Yes	37 (86)	42 (86)	
Climate-related stress, n (%)	No	14 (33)	28 (57)	<0.05 ^a
	Yes	29 (67)	21 (43)	
Self-assessed health, n (%)	poor/fair	9 (21)	7 (14)	=0.402 ^a
	good/very good/excellent	34(79)	42 (86)	
One or more health issue, n (%)	No	11(26)	21 (43)	=0.083 ^a
	Yes	32(74)	28 (57)	

^aChi-square test.^bANOVA.

(n=26 [60%]), while the majority of non-Aboriginal participants indicated that seasonal change was a mild problem or not a problem (n=30 [61%]) (Table 1). Individual seasonality elements were compared between Aboriginal and non-Aboriginal participants. Aboriginal participants scored significantly higher means for sleep, social activity, and energy level; indicating greater seasonal change in sleep, so-

cial activity, and energy level. Aboriginal participants also scored significantly higher means in whether seasonal change was a problem and GSS (Global Seasonality Score) total (Table 1); thus indicating that seasonality has a greater impact on Aboriginal participants than non-Aboriginal participants. There was not a significant difference in mean scores for mood, weight and appetite between Aboriginal and non-Aboriginal participants (Table 1). This indicates that the occurrence of SAD among the Aboriginal group may be associated with fluctuations in sleep, social activity, and energy level, and experiencing a moderate to disabling problem with seasonal change. In comparison to non-Aboriginal participants, Aboriginal participants were almost 4 times more likely to experience SAD (OR 3.84, 95% CI 1.33-11.08) (Table 2).

Average sleep length in winter, spring, and fall, and climate-related stress significantly differed between Aboriginal and non-Aboriginal participants (Table 3). There were significantly more Aboriginal participants that indicated an average sleep length of 9 hours or more per day during the fall, winter, and spring; there was not a significant difference for average sleep length in summer between the two groups (Table 3). The majority of Aboriginal participants (67%) indicated that they do experience climate-related stress; whereas 57% of non-Aboriginal participants indicated that they do not experience climate-related stress (Table 3). Logistic regression analyses showed that age, gender, BMI, weight fluctuation, health issues, food preference, stress, climate-related stress, and seasonal sleep length were not significantly related to either psychological distress or SAD, when controlling for background. Background and self-rated health status were the only significant predictors of distress, and background was the sole significant predictor of SAD.

DISCUSSION

The main purpose of the study was to determine the current overall health status and the occurrence of distress and SAD for urban Aboriginal and non-Aboriginal survey participants. The main finding of this study is that urban Aboriginal participants were more likely to be afflicted with psychological distress and SAD than non-Aboriginal participants. The occurrence of distress and SAD is significantly higher among the Aboriginal sample, strengthening recent evidence that there is a greater occurrence of poor mental health among urban Aboriginal populations than urban non-Aboriginal populations (Tam et al., 2012; Tjepkema, 2002). In the present study, Aboriginal participants were nearly three times more likely to exhibit symptoms of psychological distress than non-Aboriginal participants. This is comparable to the results of a national study conducted in 2002 (Canadian Community Health Survey [CCHS]), where those of Aboriginal descent were more likely to experience psychological distress than their **Caucasian** counterparts (Caron and Liu, 2010). It has been found that though the general well-being of urban Aboriginal populations has significantly improved over the past years, their socioeconomic status continues to fall behind that of the non-Aboriginal population (Signer and Costa, 2005; Stout and Kipling, 2002); and due to a lower socioeconomic status, Aboriginal peoples generally have poorer health than non-Aboriginals in Canada (Adelson, 2005; MacMillan et al., 1996; Stout and Kipling, 2002; Tjepkema, 2002). The determinants of distress and SAD among the urban Aboriginal sample in the present study have yet to be determined, though it has been reported elsewhere that those of lower socioeconomic status have higher rates of mental distress (Caron and Liu, 2010; Orpana et al., 2009). Further research on the determinants of psychological distress and SAD among the urban Aboriginal sample is needed.

Urban Aboriginal participants had significantly greater odds of experiencing SAD than their non-Aboriginal counterparts, indicating that the urban Aboriginal sample is more sensitive to seasonal change. In contrast, the difference of SAD occurrence between Natives and non-Natives in Alaska (Booker

and Hellekson, 1992) and northern Scandinavia (Hansen et al. 1998) was found to be insignificant. As found in literature, the occurrence of SAD amongst various ethnic groups is variable (Magnusson, 2000), which could account for the varying results among different Aboriginal groups. Nonetheless, the finding that the urban Aboriginal sample is at greater risk for distress and SAD may be an indication of a higher susceptibility to poorer mental health.

In comparing the responses for self-rated health, there was not a significant difference between Aboriginal and non-Aboriginal participants. The majority of both groups, 79% of the Aboriginal group and 86% of the non-Aboriginal group, reported their health to be good, very good, or excellent; 21% of the Aboriginal sample and 14% of the non-Aboriginal sample rated their health as poor or fair. These results corroborate findings from the Aboriginal Peoples Survey (APS) and the CCHS (O'Donnell and Tait, 2004; Tjepkema, 2002). The APS reported that the majority of the off-reserve Aboriginal population rated their health as good to excellent (O'Donnell and Tait, 2004), and the CCHS reported that 23% of the Aboriginal population and 12% of the non-Aboriginal population rated their health as poor or fair (Tjepkema, 2002). What is significant in the present study is that though the majority of Aboriginal participants reported good to excellent health, 47% and 42% still exhibited emotional distress and cases of SAD, respectively. This is similar to findings in the APS, where though there was a majority of Aboriginal adults that self rated their health as very good/excellent, there was also a majority of Aboriginal adults who reported at least one chronic illness. Furthermore, when looking at self-rated health status of all participants (regardless of background), those who reported their health status to be poor/fair were more likely to exhibit emotional distress. This is consistent with past studies that have found a significant relationship between perceived poor health and psychological distress/depression (Kivinen et al., 1998; Molarius and Janson, 2002; Tessler and Mechanic, 1978).

Stress did not significantly differ between Aboriginal and non-Aboriginal participants. The majority of both groups indicated that they do ex-

perience stress throughout the year. Stressors vary from one individual to another, though it is speculated that the most frequent type of stress both groups experience are minor stressors that occur on a regular basis. Minor stressors may include day to day challenges involving family demands, interpersonal conflicts, work issues, or other daily hassles (Bolger et al., 1989). What did differ between the two groups, however, were the responses to whether climate was a significant factor to stress. The majority of the Aboriginal sample indicated that they do experience climate-related stress; whereas the majority of the non-Aboriginal sample indicated that they do not experience climate-related stress. This corroborates the finding that the urban Aboriginal sample is more susceptible to SAD. Different sensitivity levels and reactions to stress may be the reason why responses to climate-related stress did significantly differ between the two samples. Aboriginal groups in Canada have a connection to the land and their environment; and because of this, are more sensitive to changes in climate (Ford et al., 2010). Moreover, those with a lower socioeconomic status are more vulnerable to the effects of stress, heat stress (Kovats and Hajat, 2008), and psychological distress; whereas those with a higher socioeconomic status may experience more stress, but have greater resiliency to the effects (Grzywacz et al., 2004; Kovats and Hajat, 2008). The occurrence of climate-related stress among the Aboriginal sample may be a reflection of greater sensitivity to climate-related stress, though further research is required to understand this relationship.

The underlying determinants of SAD and distress among urban Aboriginal participants are unclear, though it is speculated that social and health inequalities that plague Aboriginal peoples may be relevant factors. Aboriginal people living in an urban setting face different challenges than those living in rural areas. Racist treatment in health care has been associated to poor health status among urban Aboriginal people in Australia (Gallaher et al., 2009; Paradies et al., 2008; Ziersch et al., 2011). Homelessness, housing issues, and substance abuse are risk-factors for mental and physical health problems among urban Aboriginal people in Canada

(Brassard et al., 2008; Browne et al., 2009; Jacobs and Gill, 2001; Potter et al., 2005). In addition, discrimination continues to be a barrier to health care (Browne and Fiske, 2001; Shah and Farkas, 1985). A barrier to accessing cancer-related health care services for urban Aboriginal women in the United States is the difficulty in obtaining government support (Burhansstipanov, 2000). Determinants of mental health illnesses among urban Aboriginal groups are complex because they are often related to social, economic, and political inequalities. As these inequalities continue to affect urban Aboriginal groups, risks of mental health illnesses may persist.

A limitation of the study is the limited information obtained on socioeconomic status of participants. There may be other factors such as income level, educational level, or job status that differ between the two groups and contribute to the differences in health status. The lack of information regarding the total number of people contacted for the study is a limitation. Due to various recruitment techniques, we were not able to obtain an accurate total number of people contacted; thus, we were not able to calculate the response rate of the study. Given the number of recruitment methods, it is speculated that the response rate for the study was small. Margin of error was also not calculated due to the convenience sampling. Convenience sampling lacks random selection; thus, results may be skewed towards a specific group. It is possible that there may have been a greater response from those afflicted with a mental health issue or from those who are more interested in mental health. It is possible that only certain groups saw the recruitment advertisements; e.g., educated individuals from an organization's listserv or those with greater resources. Individuals who are of lower income status or are homeless may not have access to the Internet or be on any listservs, and thus would not have received an electronic posting of the study. Another limitation is that the study consists of a small sample size. For these reasons, results are not representative of the urban Aboriginal population in Canada and should be taken with caution; replication of the present study on a larger sample size based on random sampling is required.

The GHQ-12 and SPAQ are self-report screening instruments; though both the GHQ-12 and SPAQ have been found to be highly reliable (Goldberg et al., 1997; Magnusson et al., 1997; Salama-Younes et al., 2009; Sanchez-Lopez and Dresch, 2008; Young et al., 2003), self assessments may be subjective and thus a limitation. In addition to the GHQ-12 and SPAQ, structured diagnostic interviews conducted by mental health professionals may provide a more detailed and objective diagnosis of mental health conditions. Despite these limitations, this study serves as a basis in understanding the differences in mental well-being between an urban Aboriginal group and a non-Aboriginal group. There is limited research on urban Aboriginal populations (Wilson and Young, 2008; Young, 2003), let alone the mental health of Aboriginals. This study presents novel findings specifically on an urban Aboriginal group, where Aboriginal participants exhibited significantly greater odds of being afflicted with SAD and emotional distress than non-Aboriginal participants. There is a need for additional research to comprehensively understand the mental health of the Canadian urban Aboriginal population.

REFERENCES

- Adelson, N. (2005). The embodiment of inequity: Health disparities in Aboriginal Canada. *Canadian Journal of Public Health, 96*(2), S45-S61.
- Australian Bureau of Statistics. (2007). *Population Distribution, Aboriginal and Torres Strait Islander Australians, 2006*. Catalog No. 4705.0. Australian Bureau of Statistics.
- Bartko, J.J. and Kasper, S. (1989). Seasonal changes in mood and behavior: A cluster analytic approach. *Psychiatry Research, 28*(2), 227-239. doi:[http://dx.doi.org/10.1016/0165-1781\(89\)90049-8](http://dx.doi.org/10.1016/0165-1781(89)90049-8).
- Beiser, M. and Stewart, M. (2005). Reducing health disparities: A priority for Canada. *Canadian Journal of Public Health, 96*(2), S4-S7.
- Bodsworth, S.M., Clare, I.C.H., Simblett, S.K., and Deafblind UK (2011). Deafblindness and mental health: Psychological distress and unmet need among adults with dual sensory impairment. *British Journal of Visual Impairment, 29*(6). doi:10.1177/0264619610387495.
- Bolger, N., DeLongis, A., Kessler, R.C., and Schilling, E.A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology, 57*(5), 808-818. doi:10.1037/0022-3514.57.5.808.
- Booker, J.M. and Hellekson, C.J. (1992). Prevalence of seasonal affective disorder in Alaska. *The American Journal of Psychiatry, 149*(9), 1176-1182.
- Bourassa, C., McKay-McNabb, K., and Hampton, M. (2005). Racism, sexism, and colonialism: The impact on the health of Aboriginal Women in Canada. *Canadian Women Studies, 24*(1), 23-30.
- Bowen, A., Stewart, N., Baetz, M., and Muhajarine, N. (2009). Antenatal depression in socially high-risk women in Canada. *Journal of Epidemiology & Community Health, 63*(5), 414-416. doi:10.1136/jech.2008.078832.
- Brassard, P., Anderson, K.K., Menzies, D., Schwartzman, K., and Macdonald, M.E. (2008). Knowledge and perceptions of tuberculosis among a sample of urban Aboriginal people. *Journal of Community Health, 33*(4), 192-198. doi:10.1007/s10900-008-9085-9.
- Broadway, J., Arendt, J., and Folkard, S. (1987). Bright light phase shifts the human melatonin rhythm during the Antarctic winter. *Neuroscience Letters, 79*(1-2), 185-189. doi:10.1016/0304-3940(87)90694-x.
- Browne, A.J. and Fiske, J.-A. (2001). First Nations women's encounters with mainstream health care services. *Western Journal of Nursing Research 23*(2), 126-147. doi:10.1177/019394590102300203.
- Browne, A.J., McDonald, H., and Elliott, D. (2009). *First Nations Urban Aboriginal Health Research Discussion Paper. A Report for the First Nations Centre*.
- Burhansstipanov, L. (2000). Urban Native American health issues. *Cancer, 88*(5), 1207-1213.
- Cagnacci, A., Elliott, J.A., and Yen, S.S. (1992). Melatonin: A major regulator of the circadian rhythm of core temperature in humans. *The Journal of Clinical Endocrinology & Metabolism, 75*(2), 447-452. doi:10.1210/jc.75.2.447.
- Caron, J. and Liu, A. (2010). A descriptive study of the prevalence of psychological distress and mental disorders in the Canadian population: Comparison between low-income and non-low-income populations. *Chronic Diseases in Canada, 30*(3), 84-94.

- Chandola, T. and Jenkinson, C. (2000). Validating self-rated health in different ethnic groups. *Ethnicity and Health, 5*(2), 151–159. doi:10.1080/713667451.
- Checkley, S.A., Murphy, D.G., Abbas, M., Marks, M., Winton, F., Palazidou, E., Murphy, D.M., Franey, C., and Arendt, J. (1993). Melatonin rhythms in seasonal affective disorder. *The British Journal of Psychiatry, 163*(332–337).
- Choi, J., Baek, J.H., Noh, J., Kim, J.S., Choi, J.S., Ha, K., Kwon, J.S., and Hong, K.S. (2011). Association of seasonality and premenstrual symptoms in Bipolar I and Bipolar II disorders. *Journal of Affective Disorders, 129*(1–3), 313–316.
- Dohrenwend, B.P., Shrout, P.E., Egri, G., and Mendelsohn, F.S. (1980). Nonspecific psychological distress and other dimensions of psychopathology. *Archives of General Psychiatry, 37*, 1229–1236.
- Doi, Y. and Minowa, M. (2003). Factor structure of the 12-item General Health Questionnaire in the Japanese general adult population. *Psychiatry and Clinical Neurosciences, 57*, 379–383. doi:10.1046/j.1440-1819.2003.01135.x.
- Eades, S.J., Taylor, B., Bailey, S., Williamson, A.B., Craig, J.C., and Redman, S. (2010). The health of urban Aboriginal people: Insufficient data to close the gap. *The Medical Journal of Australia, 193*(9), 521–524.
- Eastman, C.I., Gallo, L.C., Lahmeyer, H.W., and Fogg, L.F. (1993). The circadian rhythm of temperature during light treatment for winter depression. *Biological Psychiatry, 34*(4), 210–220. doi:10.1016/0006-3223(93)90074-n.
- Ferrie, J.E., Shipley, M.J., Cappuccio, F.P., Brunner, E., Miller, M.A., Kumari, M., and Marmot, M.J. (2007). A prospective study of change in sleep duration: associations with mortality in the Whitehall II cohort. *Sleep, 30*(12), 1659–1666.
- The First Nations Information Governance Centre (FNIGC). (2012). *First Nations Regional Health Survey (RHS) 2008/10: National Report on the Adult, Youth and Children Living in First Nations Communities*. The First Nations Information Governance Centre.
- Ford, J.D., Berrang-Ford, L., King, M., and Furgal, C. (2010). Vulnerability of Aboriginal health systems in Canada to climate change. *Global Environmental Change, 20*(4), 668–680. doi:10.1016/j.gloenvcha.2010.05.003.
- Gallagher, G., Ziersch, A., Baum, F., Bentley, M., Palmer, C., Edmondson, W., and Winslow, L. (2009). *In our own Backyard: Urban Health Inequities and Aboriginal Experiences of Neighbourhood Life, Social Capital and Racism*. South Australian Community Health Research Unit, Flinders University of South Australia.
- George, D. and Mallery, P. (2003). *SPSS for Windows Step by Step: A Simple Guide and Reference 11.0 Update*. Fourth edition. Boston: Allyn & Bacon.
- Germain, A. and Kupfer, D.J. (2009). Circadian rhythm disturbances in depression. *Human Psychopharmacology, 237*(571–585).
- Germain, M.-F., Costa, R., and Kelly-Scott, K. (2009). *2006 Aboriginal Population Profile for Toronto*. Ottawa: Statistics Canada.
- Goldberg, D. (1985). Identifying psychiatric illness among general medical patients. *British Medical Journal, 291*(6489), 161–162. doi:10.1136/bmj.291.6489.161.
- Goldberg, D.P., Gater, R., Sartorius, N., Ustun, T.B., Piccinelli, M., Gureje, O., and Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine, 27*(1), 191–197.
- Goldberg, D.P., Oldehinkel, T., and Ormel, J. (1988). Why GHQ threshold varies from one place to another. *Psychological Medicine, 28*(4), 915–921.
- Grzywacz, J.G., Almeida, D.M., Neupert, S.D., and Ettner, S.L. (2004). Socioeconomic status and health: A micro-level analysis of exposure and vulnerability to daily stressors. *Journal of Health and Social Behavior, 45*(1), 1–16.
- Haggarty, J.M., Cernovsky, Z., Husni, M., Minor, K., Kermeen, P., and Merskey, H. (2002). Seasonal affective disorder in an Arctic community. *Acta Psychiatrica Scandinavica, 105*(5), 378–384.
- Han, L., Wang, K., Du, Z., Cheng, Y., Simons, J.S., and Rosenthal, N.E. (2000). Seasonal variations in mood and behavior among Chinese medical students. *The American Journal of Psychiatry, 157*(1), 133–135.
- Hansen, V., Lund, E., and Smith-Sivertsen, T. (1998). Self-reported mental distress under the shifting daylight in the high north. *Psychological Medicine, 28*, 447–452.
- Healy, D. (1987). Rhythm and blues. Neurochemical, neuropharmacological and neuropsychological implications of a hypothesis of circadian rhythm dysfunction in the affective disorders. *Psychopharmacology, 93*(3), 271–285. doi:10.1007/bf00187243.
- Idler, E.L. and Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior, 38*(1), 21–37.
- Ilfeld, F.W. (1976). Further validation of a psychiatric symptom index in a normal population. *Psychological Reports, 39*, 1215–1228.
- Jacobs, K. and Gill, K. (2001). Substance abuse in an urban Aboriginal population. *Journal of Ethnicity in Substance Abuse, 1*(1), 7–25. doi:10.1300/J233v01n01_02.
- Jakubec, L. and Engeland, J. (2004). *2001 Census Housing Series: Issue 6 Revised - Aboriginal households. Policy and Research Division*. Ottawa: Statistics Canada.
- Jang, K.L., Lam, R.W., Livesley, W.J., and Vernon, P.A. (1997). Gender differences in the heritability of seasonal mood change. *Psychiatry Research, 70*(3), 145–154.
- King, M., Smith, A., and Gracey, M. (2009). Indigenous health part 2: The underlying causes of the health gap. *The Lancet, 374*, 76–85.
- Kirmayer, L., Simpson, C., and Cargo, M. (2003). Healing traditions: Culture, community and mental health promotion with Canadian Aboriginal peoples. *Australasian Psychiatry, 11*, S15–S23.
- Kirmayer, L.J. (1994). Suicide among Canadian aboriginal peoples. *Transcultural Psychiatry, 31*(1), 3–58.
- Kirmayer, L.J., Gill, K., Fletcher, C., Ternar, Y., Boothroyd, L., Quesney, C., Smith, A., Ferrara, N., and Hayton, B. (1994). *Emerging Trends in Research on Mental Health among Canadian Aboriginal Peoples (Report No. 2)*. Culture & Mental Health Research Unit, Institute of Community & Family Psychiatry, Sir Mortimer B. Davis-Jewish General Hospital and Division of Social & Transcultural Psychiatry, Department of Psychiatry, McGill University.
- Kivinen, P., Halonen, P., Eronen, M., and Nissinen, A. (1998). Self-rated health, physician-related health and associated factors among elderly men: The Finnish cohorts of the Seven Countries Study. *Age and Ageing, 27*, 41–47.
- Kovats, R.S. and Hajat, S. (2008). Heat stress and public health: A critical review. *Annual Review of Public Health, 29*, 41–55. doi:10.1146/annurev.publhealth.29.020907.090843.
- Laliberté, A. and Tousignant, M. (2009). Alcohol and other contextual factors of suicide in four Aboriginal communities of Quebec, Canada. *Crisis, 30*(4), 215–221. doi:10.1027/0227-5910.30.4.215.
- Lam, R.W. and Levitt, A.J. (1999). *Canadian Consensus Guidelines for the Treatment of Seasonal Affective Disorder*. Clinical and Academic Publishing.
- Leenaars, A.A. (2006). Suicide among Indigenous peoples: Introduction and call to action. *Archives of Suicide Research, 10*(2), 103–115.
- Levitt, A.J., Boyle, M.H., Joffe, R.T., and Bauml, Z. (2000). Estimated prevalence of the seasonal subtype of major depression in a Canadian community sample. *Canadian Journal of Psychiatry, 45*(7), 650–654.
- Lewy, A.J., Wehr, T.A., Goodwin, F.K., Newsome, D.A., and Markey, S.P. (1980). Light suppresses melatonin secretion in humans. *Science, 210*(4475), 1267–1269.
- MacMillan, H.L., MacMillan, A.B., Offord, D.R., and Dingle, J.L. (1996). Aboriginal health. *Canadian Medical Association Journal, 155*(11), 1569–1578.
- Magnusson, A. (2000). An overview of epidemiological studies on seasonal affective disorder. *Acta Psychiatrica Scandinavica, 101*, 176–184. doi:10.1034/j.1600-0447.2000.101003176.x.
- Magnusson, A., Friis, S., and Opjordsmoen, S. (1997). Internal consistency of the seasonal pattern assessment questionnaire (SPAQ). *Journal of Affective Disorders, 42*(2–3), 113–116.
- McCabe, C.J., Thomas, K.J., Brazier, J.E., and Coleman, P. (1996). Measuring the mental health status of a population: A comparison of the GHQ-12 and the SF-36 (MHI-5). *The British Journal of Psychiatry, 169*, 516–521. doi:10.1192/bjp.169.4.516.
- McGrath-Hanna, N.K., Greene, D.M., Tavernier, R.J., and Bult-Ito, A. (2003). Diet and mental health in the Arctic: Is diet an important risk factor for mental health in circumpolar peoples? A review.

- International Journal of Circumpolar Health*, 62(3), 228–241.
- Molarius, A. and Janson, S. (2002). Self-rated health, chronic diseases, and symptoms among middle-aged and elderly men and women. *Journal of Clinical Epidemiology*, 55, 364–370.
- Mossey, J.M. and Shapiro, E. (1982). Self-rated health: A predictor of mortality among the elderly. *American Journal of Public Health*, 72(8), 800–808. doi:10.2105/AJPH.72.8.800.
- Murray, G. (2004). How common is seasonal affective disorder in temperate Australia? A comparison of BDI and SPAQ estimates. *Journal of Affective Disorders*, 81(1), 23–28.
- O'Donnell, V. and Tait, H. (2004). *Well-being of the Non-reserve Aboriginal Population*. Ottawa: Statistics Canada.
- Orpana, H.M., Lemyre, L., and Gravel, R. (2009). Income and psychological distress: The role of the social environment. *Health Reports*, 20(1), 21–28.
- Pajunen, P., Lonnqvist, J., and Partonen, T. (2007). Seasonal changes in mood and behavior in relation to work conditions among the general population. *Scandinavian Journal of Work Environment and Health*, 33(3), 198–203.
- Paradies, Y., Harris, R., and Anderson, I. (2008). *The Impact of Racism on Indigenous Health in Australia and Aotearoa: Towards a Research Agenda, Discussion Paper No. 4*. Cooperative Research Centre for Aboriginal Health, National Collaborating Centre for Aboriginal.
- Partonen, T., Vakkuri, O., Lamberg-Allardt, C., and Lönnqvist, J. (1996). Effects of bright light on sleepiness, melatonin, and 25-hydroxyvitamin D₃ in winter seasonal affective disorder. *Biological Psychiatry*, 39(10), 865–872. doi:10.1016/0006-3223(95)00294-4.
- Partonen, T., Vakkuri, O., and Lönnqvist, J. (1997). Suppression of melatonin secretion by bright light in seasonal affective disorder. *Biological Psychiatry*, 42(6), 509–513. doi:10.1016/s0006-3223(96)00376-9.
- Pink, B. and Allbon, P. (2008). *The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples*. Potter, B., Rindfleisch, K., and Kraus, C.K. (2005). Management of active tuberculosis. *American Family Physician*, 72, 2225–2232.
- Reading, C.L. and Wien, F. (2009). *Health Inequalities and Social Determinants of Aboriginal Peoples' Health*. Ottawa: National Collaborating Centre for Aboriginal Health.
- Rice, J., Mayor, J., Tucker, H.A., and J. Bielski, R. (1995). Effect of light therapy on salivary melatonin in seasonal affective disorder. *Psychiatry Research*, 56(3), 221–228. doi:10.1016/0165-1781(95)02610-9.
- Rosenthal, N.E., Genhart, M., Jacobsen, F.M., Skwerer, R. G., and Wehr, T.A. (1987). Disturbances of appetite and weight regulation in seasonal affective disorder. *Annals of the New York Academy of Sciences*, 499(1), 216–230. doi:10.1111/j.1749-6632.1987.tb36213.x.
- Saarijarvi, S., Lauerma, H., Helenius, H., and Saarihehto, S. (1999). Seasonal affective disorders among rural Finns and Lapps. *Acta Psychiatrica Scandinavica*, 99(2), 95–101. doi:10.1111/j.1600-0447.1999.tb07206.x.
- Salama-Younes, M., Montazeri, A., Ismail, A., and Roncin, C. (2009). Factor structure and internal consistency of the 12-item general health questionnaire (GHQ-12) and the subjective vitality scale (VS), and the relationship between them: A study from France. *Health and Quality of Life Outcomes* 7(22). doi:10.1186/1477-7525-7-22.
- Sanchez-Lopez, M.P. and Dresch, V. (2008). The 12-item general health questionnaire (GHQ-12): reliability, external validity and factor structure in the Spanish population. *Psicothema* 20(4), 839–843.
- Shah, C.P. and Farkas, C.S. (1985). The health of Indians in Canadian cities: A challenge to the health care system. *Canadian Medical Association Journal*, 133, 859–863.
- Siggnér, A. and Costa, R. (2005). *Aboriginal Conditions in Census Metropolitan Areas, 1981-2001*. Ottawa: Statistics Canada.
- Statistics Canada. (2008). *Aboriginal Peoples in Canada in 2006: Inuit, Metis and First Nations, 2006 Census*. Ottawa: Statistics Canada.
- Stout, M.D. and Kipling, G.D. (2002). *Sharing the Learning: The Health Transition Fund*. Ottawa: Health Canada.
- Suhail, K., Malik, F., Mir, I.A., Hasan, S.S., Sarwar, A., and Tanveer, S. (2009). Psychological health of earthquake survivors in Pakistan. *Psychology & Developing Societies*, 21(2), 183–207.
- Tam, B.Y., Gough, W.A., Edwards, V., and Tsuji, L.J.S. (2012). Seasonal and weather-related behavioral effects among urban Aboriginal, urban non-Aboriginal, and remote Aboriginal participants in Canada. *Population and Environment*. doi:10.1007/s11111-012-0183-3.
- Tessler, R. and Mechanic, D. (1978). Psychological distress and perceived health status. *Journal of Health and Social Behavior*, 19(3), 254–262.
- Tjepkema, M. (2002). *Health of the Off-reserve Aboriginal Population*. Ottawa: Statistics Canada.
- Vaananen, A., Toppinen-Tanner, S., Kalimo, R., Mutanen, P., Vahtera, J., and Peiro, J.M. (2003). Job characteristics, physical and psychological symptoms, and social support as antecedents of sickness absence among men and women in the private industrial sector. *Social Science and Medicine*, 57, 807–824.
- Wahlström, L., Michélsen, H., Schulman, A., and Backheden, M. (2009). Psychological distress and sick leave in Swedish survivors of the 2004 tsunami: A comparison with a population sample. *The Journal of Nervous and Mental Disease*, 197(2), 918–922.
- Wardman, D. and Khan, N. (2004). Antidepressant medication use among First Nations peoples residing within British Columbia. *American Indian and Alaska Native Mental Health Research* 11(3), 43–48.
- Wehr, T.A., Sack, D., Rosenthal, N., Duncan, W., and Gillin, J.C. (1983). Circadian rhythm disturbances in manic-depressive illness. *Federation Proceedings*, 42(11), 2809–2814.
- World Health Organization (WHO). (2010). *Mental Health and Development: Targeting People with Mental Health Conditions as a Vulnerable Group*. World Health Organization. Retrieved from http://www.who.int/mental_health/policy/mhtargeting/en/index.html.
- Wilson, K. and Young, T.K. (2008). An overview of Aboriginal health research in the social sciences: Current trends and future directions. *International Journal of Circumpolar Health* 67(2–3), 179–189.
- Yang, M.-S., Yang, M.-J., Chang, S.-J., Chen, S.-C., and Ko, Y.-C. (2006). Intimate partner violence and minor psychiatric morbidity of Aboriginal Taiwanese women. *Public Health Reports*, 121, 453–459.
- Young, M.A., Blodgett, C., and Reardon, A. (2003). Measuring seasonality: Psychometric properties of the Seasonal Pattern Assessment Questionnaire and the Inventory for Seasonal Variation. *Psychiatry Research* 117, 75–83.
- Young, T.K. (2003). Review of research on aboriginal populations in Canada: Relevance to their health needs. *British Medical Journal*, 327, 419–422.
- Ziersch, A.M., Gallaher, G., Baum, F., and Bentley, M. (2011). Responding to racism: Insights on how racism can damage health from an urban study of Australian Aboriginal people. *Social Science and Medicine*, 73(7), 1045–1053. doi:10.1016/j.socscimed.2011.06.058.

Benita Tam, PhD, is a CIHR postdoctoral fellow with the Department of Environment and Resource Studies at the University of Waterloo. She completed her PhD in the Department of Geography at the University of Toronto. Her research interests include Aboriginal health, climatology, and environmental health. Benita has partnered with urban Aboriginal communities in Toronto, Ontario, and with rural First Nation communities in Fort Albany, Ontario, and Ouje-Bougoumou, Quebec. For her doctoral work, she examined the implications of climate change and variability on Aboriginal communities in Canada. Benita is currently collaborating with Aboriginal communities in delineating determinants of health to environmental/climatic issues, and subsequently, formulating relevant adaptive strategies. benita.tam@gmail.com.

William Gough, PhD, is the Vice-Dean of Graduate Education and Program Development at the University of Toronto Scarborough, as well as an associate professor in the Department of Physical and Environmental Sciences at the University of Toronto Scarborough, and the Department of Geography at the University of Toronto. His research focuses in climate change modelling and impacts, permafrost, and Arctic research. gough@utsc.utoronto.ca.

