

Socioeconomic inequalities in psychological distress and suicidal behaviours among Indigenous peoples living off-reserve in Canada

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■ Cite as: *CMAJ* 2019 March 25;191:E325-36. doi: 10.1503/cmaj.181374

Visual abstract available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.181374/-/DC2

ABSTRACT

BACKGROUND: Indigenous peoples in Canada have high rates of psychological distress and suicide. We sought to assess the socioeconomic inequalities in psychological distress and suicidal behaviours, and the factors that explain them within Indigenous peoples living off-reserve.

METHODS: Using the nationally representative 2012 Aboriginal Peoples Survey collected from Indigenous adults living off-reserve in Canada, we measured income-related inequalities in psychological distress (measured on the 10-item Kessler Psychological Distress Scale) and suicidal behaviours (suicidal ideation and suicide attempt) and identified factors contributing to these

inequalities using the concentration index (C) approach.

RESULTS: Among 14410 individuals representing 600 750 Indigenous adults (aged ≥ 18 yr) living off-reserve in Canada, the mean score of psychological distress was 16.1; 19.4% reported lifetime suicidal ideation and 2.2% reported a lifetime suicide attempt. Women had higher psychological distress scores (mean score 16.7 v. 15.2, $p < 0.001$), and prevalence of suicidal ideation (21.9% v. 16.1%, $p < 0.001$) and suicide attempts (2.3% v. 2.0%, $p = 0.002$) than men. Poorer individuals disproportionately experienced higher psychological distress ($C = -0.054$, 95% confidence interval [CI] -0.057 to -0.050),

suicidal ideation ($C_n = -0.218$, 95% CI -0.242 to -0.194) and suicide attempts ($C_n = -0.327$, 95% CI -0.391 to -0.263). Food insecurity and income, respectively, accounted for 40.2% and 13.7% of the psychological distress, 26.7% and 18.2% of the suicidal ideation and 13.4% and 7.8% of the suicide attempts concentrated among low-income Indigenous peoples.

INTERPRETATION: Substantial income-related inequalities in psychological distress and suicidal behaviours exist among Indigenous peoples living off-reserve in Canada. Policies designed to address major contributing factors such as food insecurity and income may help reduce these inequalities.

Worldwide, Indigenous populations have high rates of suicide and psychological distress, the latter characterized by psychological and physiologic symptoms of anxiety and depression.¹⁻³ Suicide is a major cause of death among First Nations, Métis and Inuit peoples,⁴ the 3 distinct Indigenous groups in Canada. Suicide rates among Indigenous peoples, when considered collectively, are 2 to 3 times higher than among non-Indigenous Canadians.⁵ Rates of suicide and distress vary considerably across the Indigenous groups. During the period between 1991 and 2001, the Indigenous to non-Indigenous suicide mortality rate ratio was 1.60 for Métis men, 0.85 for Métis women, 1.66 for status First Nations men and 1.86 for status First Nations women.⁶ Suicide rates among the Inuit, which are among the highest in the world, are up to 10 times higher than the overall rate for Canada.^{5,7,8} Suicide led to life expectancy losses of

4.8 years for men and 1.2 years for women in Inuit Nunangat in 1999-2003.⁹ Suicide rates are higher among First Nations peoples living on-reserve than among Indigenous peoples living off-reserve.¹⁰ The rate ratios for potential years of life lost owing to suicide among status First Nation men living on- and off-reserve compared with non-Indigenous men (women) were 2.88 (3.71) and 1.11 (0.76), respectively.¹¹ Furthermore, except for Métis men, suicidal thoughts among Indigenous peoples are more common than among non-Indigenous Canadians.¹²

Historical and ongoing experiences associated with colonization accompanied by inequities in income, employment opportunities, housing and food security, among other factors, have resulted in pervasive health problems among Indigenous peoples.^{4,13-21} Indigenous populations have the poorest health outcomes in Canada, often similar to those of populations in developing countries.¹⁸

Income has been shown to be a main determinant of health among both Indigenous²² and the general Canadian populations.²³ Recent evidence points to a particularly strong income-related gradient in mental health outcomes compared with most other health outcomes.²⁴ The role of income may be especially important given persistently lower incomes among Indigenous populations compared with non-Indigenous populations, with a gap of 25% in 2015 and little improvement since 2005.²⁵ There is scant literature on socioeconomic inequalities in mental health within Indigenous peoples in Canada, despite considerable variations in collective histories, present-day circumstances and cultures.

Using data from the 2012 Aboriginal Peoples Survey, we quantified the extent of and factors accounting for income-related inequalities in psychological distress and suicidal behaviours among status First Nations, non-status First Nations, Métis and Inuit peoples living off-reserve in Canada.

Methods

Sample

We used data from the confidential master files of the 2012 Aboriginal Peoples Survey conducted by Statistics Canada. A large cross-sectional survey, with a response rate in 2012 of 76%,²⁶ the Aboriginal Peoples Survey collects detailed data on the social and economic conditions (e.g., education, employment, health, language, income, housing and mobility) from Indigenous peoples aged 6 years and older who are living in private dwellings, excluding those living on Indian settlements and reserves and in specific First Nations communities in the Northwest Territories and Yukon.²⁶ Data from survey participants were adjusted to represent Indigenous adults living off-reserve in Canada using bootstrapped weights, as per guidelines from Statistics Canada's Research Data Centres.²⁷

Variables

Mental health outcome variables

The outcome variables included psychological distress, lifetime suicidal ideation and lifetime suicide attempt. The 10-item Kessler Psychological Distress Scale (K10) (Appendix 1A, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.181374/-/DC1)²⁸ was used to measure nonspecific psychological distress, composed of items assessing psychological and physiologic symptoms of anxiety and depression. Total scores of the K10 range from 10 (no distress) to 50 (severe distress). Studies have shown that the K10 is psychometrically valid and appropriate for use in Indigenous populations living off-reserve in Canada.²⁸⁻³¹ The Aboriginal Peoples Survey also asked questions related to suicidal behaviours, from which we created 2 binary variables of suicidal behaviour: lifetime suicidal ideation and suicide attempt.

Socioeconomic position variables

We used the natural log of equivalized household income (i.e., household income divided by the square root of household size)³² as a proxy of socioeconomic status.

Explanatory variables

The decomposition analysis included variables known to be associated with mental health outcomes in Indigenous populations³³⁻⁴¹ and available in the Aboriginal Peoples Survey. These included 3 demographic variables (sex [male, female], age [continuous] and marital status [single, married, divorced or widowed]), and cultural group (status First Nations, non-status First Nations, Métis, Inuit); 6 socioeconomic variables (natural log of equivalized household income, education [\leq grade 8, grades 9-10, grade 11-secondary completed, some postsecondary, postsecondary degree/diploma], employment status [employed, not in the labour force, unemployed], household crowding [rooms per capita ≤ 2 , > 2 to 4, > 4]; housing maintenance [regular, minor or major maintenance needed]; food security [high, low, very low]); 2 behavioural variables (regular drinker, daily tobacco use); 2 social connectedness variables (strong extended family ties, no one to turn to for support); 4 cultural engagement and language variables (clothing or footwear; art craft, hunting, fishing or trapping; plant gathering; speaking Indigenous language); and 2 geographic variables (urbanicity [rural, small population centre, medium population centre, urban], region [Atlantic provinces, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, territories]). Appendix 1B reports the definitions and descriptive statistics of the variables used in the study.

Statistical analysis

The concentration index (C)⁴² was used to quantify income-related inequalities in mental health outcomes. The C is computed based on the concentration curve, which depicts the cumulative percentage of the population ranked by ascending order of a socioeconomic status variable (e.g., income), on its x -axis, against the cumulative percentage of a health outcome (e.g., psychological distress score). The C is calculated as twice the area between the diagonal (the perfect equality line) and the concentration curve.⁴³ The value of C varies from -1 to 1 , with 0 indicating perfect equality.⁴⁴ Because 2 of our outcome variables were binary (lifetime suicide ideation and attempt), the normalized concentration index (C_n) was used for these outcomes.⁴⁵ A negative (positive) value of the C and C_n indicate that the health outcome is disproportionately concentrated among individuals with low (high) socioeconomic status.

The C and C_n were decomposed to identify the contributions of a set of k explanatory variables to income-related inequality in each of the health-outcome variables. The decomposition of the C and C_n is based on the regression analysis of the association between the outcome variable and a set of k explanatory variables.⁴⁶ The negative contribution of a factor to the C_n suggests that income-related distribution of the factor (i.e., the C_k) and the association between the factor and health outcomes increase the concentration of health outcome among the poor (a positive contribution would increase the concentration of the health outcome among the rich).^{44,46} Appendix 1C provides a detailed description of the C and C_n and the decomposition of these 2 indexes. The F and χ^2 statistics were used to test the differences among covariates for continuous (i.e., psychological distress) and categorical (i.e.,

suicidal ideation and suicide attempt) variables, respectively. We used bootstrap weights provided by Statistics Canada in the analyses to obtain estimates that are representative of Indigenous populations living off-reserve in Canada and to take into account the complex survey design using the SVY command⁴⁷ in Stata 14.⁴⁸ We considered $p < 0.05$ statistically significant.

Ethics approval

We accessed the Aboriginal Peoples Survey through Statistics Canada's Atlantic Research Data Centre. Data accessed through the Research Data Centres, which follow strict disclosure protocols according to the *Statistics Act*, are exempt from research ethics board review based on the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2) article 2.2 (a).

Results

Prevalence of psychological distress and suicidal behaviours

The Aboriginal Peoples Survey included information on 28 410 respondents. After we excluded 10 550 individuals aged less than 18 years and with multiple Indigenous identities, and 3 450 missing values in outcome or explanatory variables, our final sample consisted of 14 410 individuals, representing 600 750 Indigenous people living off-reserve in Canada (Table 1).

The mean distress score among Indigenous peoples was 16.1 for both sexes, 15.2 for men and 16.7 for women ($p < 0.001$). The prevalence rates of lifetime suicidal ideation and suicide attempt among Indigenous peoples in 2012 for both sexes were 19.4% (men: 16.1%; women: 21.9%, $p < 0.001$) and 2.2% (men: 2.0%; women: 2.3%, $p = 0.002$), respectively (Tables 2 and 3).

The mean distress score varied ($p < 0.001$) among the 4 Indigenous cultural groups, with Inuit having the lowest mean distress score (total: 15.4; men: 14.6; women: 16.0) and non-status First Nations having the highest mean distress score (total: 16.8; men: 15.6; women: 17.7) (Table 2). There was also a significant variation in the prevalence of suicidal ideation ($p < 0.001$) and suicide attempt ($p < 0.001$) among the 4 Indigenous cultural groups, with Métis having the lowest rates of suicidal ideation (total: 17.5%; men: 13.8%; women: 20.5%) and suicide attempt (total: 1.7%; men: 1.2%; women: 2.2%), and Inuit having the

highest rates of suicidal ideation (total: 22.7%; men: 20.7%; women: 24.3%) and suicide attempt (total: 3.2%; men: 1.6%; women: 4.5%). The prevalence of lifetime suicide attempt was not different between Métis and status and non-status First Nations women (Table 3).

Income-related inequalities in psychological distress and suicidal behaviours

The negative values of the C for psychological distress (-0.054 , 95% confidence interval [CI] -0.057 to -0.050) and the C_n for lifetime suicidal ideation (-0.218 , 95% CI -0.242 to -0.194) and lifetime suicide attempt (-0.327 , 95% CI -0.391 to -0.263) suggest that these mental health outcomes are disproportionately concentrated among those with lower income. Income-related inequality in psychological distress was marginally greater among women ($C = -0.055$, 95% CI -0.060 to -0.050) than men ($C = -0.046$, 95% CI -0.051 to -0.040), whereas income-related inequalities in suicide attempts were higher among men ($C_n = -0.462$, 95% CI -0.562 to -0.362) than women ($C_n = -0.236$, 95% CI -0.320 to -0.152). For both men and women, income-related inequality in psychological distress was highest among status First Nations ($C = -0.069$, 95% CI -0.082 to -0.057) and lowest among Inuit ($C = -0.039$, 95% CI -0.048 to -0.030). Status First Nations men had the highest income-related inequalities in lifetime suicidal ideation ($C_n = -0.378$, 95% CI -0.496 to -0.260) and suicide attempt ($C_n = -0.629$, 95% CI -0.868 to -0.390) among Indigenous male cultural groups. Among women, income-related inequalities in suicidal behaviours were highest among Métis (suicidal ideation: $C_n = -0.215$, 95% CI -0.264 to -0.166 ; suicide attempt: $C_n = -0.269$, 95% CI -0.407 to -0.131) and lowest among Inuit (suicidal ideation: $C_n = -0.153$, 95% CI -0.226 to -0.080 ; suicide attempt: $C_n = -0.126$, 95% CI -0.278 to -0.026) (Table 4).

Determinants of income-related inequalities in psychological distress and suicidal behaviours

The decomposition analyses showed food insecurity as the most important factor contributing to income-related inequalities in the 3 mental health outcomes among men and women (Table 5). Food insecurity accounted for 40.2% (men: 38.4%; women: 42.9%), 26.7% (men: 21.4%; women: 32.2%) and 13.4% (men:

Table 1: Weighted and unweighted number of observations by sex and cultural group*

Sample	Total		Male		Female	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Total	14 410	600 750	6510	260 510	7900	340 240
Cultural group						
Status First Nations	4630	205 940	1990	84 200	2630	121 740
Non-status First Nations	1460	96 440	640	41 540	820	54 900
Métis	5970	271 990	2800	123 380	3160	148 610
Inuit	2360	26 380	1080	11 400	1290	14 990

*The number of observations was rounded to base 10 as per the data disclosure policy of Statistics Canada's Research Data Centres for the Aboriginal Peoples Survey.

Table 2 (part 1 of 2): Mean scores* on the 10-item Kessler Psychological Distress Scale among Indigenous peoples living off-reserve (n = 14 410)

Characteristic	Total		Men		Women	
	Mean score	p value	Mean score	p value	Mean score	p value
Total	16.1		15.2		16.7	
Demographic variable						
Sex						
Male	15.2	< 0.001				
Female	16.7					
Marital status						
Married	17.0	< 0.001	16.3	< 0.001	17.6	< 0.001
Divorced or widowed	15.2		14.5		15.8	
Single	17.3		15.7		17.8	
Cultural group						
Métis	15.9	< 0.001	15.0	< 0.001	16.6	< 0.001
Status First Nations	16.1		15.3		16.6	
Non-status First Nations	16.8		15.6		17.7	
Inuit	15.4		14.6		16.0	
Socioeconomic variable						
Education level						
≤ Grade 8	16.5	< 0.001	16.0	< 0.001	17.0	< 0.001
Grades 9–10	17.9		16.2		19.3	
Grade 11–secondary completed	16.2		15.3		16.9	
Some postsecondary	16.4		15.5		17.3	
Postsecondary degree/diploma	15.4		14.6		15.9	
Employment status						
Employed	15.2	< 0.001	14.7	< 0.001	15.7	< 0.001
Not in the labour force	17.9		16.6		18.5	
Unemployed	16.9		15.9		17.8	
Household crowding						
Rooms per capita ≤ 2	16.6	< 0.001	15.6	< 0.001	17.4	< 0.001
Rooms per capita > 2 to 4	15.5		14.7		16.1	
Rooms per capita > 4	15.1		14.7		15.5	
Housing maintenance						
Regular	15.5	< 0.001	14.8	< 0.001	16.0	< 0.001
Minor	16.3		15.3		17.1	
Major	17.9		16.6		18.8	
Food security						
High	14.9	< 0.001	14.3	< 0.001	15.4	< 0.001
Low	18.8		18.2		19.3	
Very low	23.7		22.2		24.4	
Behavioural variable						
Drinking habit						
Regular drinker (yes)	15.7	< 0.001	14.9	< 0.001	16.4	< 0.001
Regular drinker (no)	16.6		15.7		17.1	
Smoking habit						
Daily tobacco use (yes)	17.9	< 0.001	16.8	< 0.001	18.7	< 0.001
Daily tobacco use (no)	15.3		14.4		15.9	

Table 2 (part 2 of 2): Mean scores* on the 10-item Kessler Psychological Distress Scale among Indigenous peoples living off-reserve (n = 14 410)

Characteristic	Total		Men		Women	
	Mean score	p value	Mean score	p value	Mean score	p value
Social connectedness variable						
Strong extended family tie (yes)	15.1	< 0.001	14.1	< 0.001	15.8	< 0.001
Strong extended family tie (no)	17.0		16.1		17.9	
No one to turn to for support (yes)	18.5	< 0.001	16.0	< 0.001	21.7	< 0.001
No one to turn to for support (no)	15.9		15.1		16.5	
Other cultural variable						
Cultural engagement						
Clothing or footwear (yes)	17.0	< 0.001	17.0	< 0.001	17.1	0.002
Clothing or footwear (no)	16.0		15.1		16.7	
Art craft (yes)	17.4	< 0.001	16.6	< 0.001	17.9	< 0.001
Art craft (no)	15.5		14.8		16.2	
Hunting/fishing/trapping (yes)	15.6	< 0.001	14.9	< 0.001	16.7	0.7
Hunting/fishing/trapping (no)	16.3		15.5		16.8	
Plant gathering (yes)	16.5	< 0.001	15.3	0.05	17.4	< 0.001
Plant gathering (no)	15.9		15.1		16.5	
Language						
Speak Indigenous language (yes)	15.9	0.04	14.6	< 0.001	16.7	0.8
Speak Indigenous language (no)	16.1		15.3		16.8	
Residential school variable						
Not attended	15.7	< 0.001	15.0	< 0.001	16.3	< 0.001
Any family member attended	16.7		15.6		17.5	
Missing	17.1		15.8		18.2	
Geographical variable						
Urbanicity						
Rural	15.0	< 0.001	14.7	< 0.001	15.3	< 0.001
Small population centre	15.4		14.7		16.0	
Medium population centre	16.8		15.1		17.8	
Urban	16.7		15.7		17.5	
Regions						
Atlantic provinces	15.3	< 0.001	14.2	< 0.001	16.1	< 0.001
Quebec	15.5		15.2		15.8	
Ontario	16.6		15.5		17.5	
Manitoba	16.4		15.5		17.1	
Saskatchewan	15.5		14.8		16.0	
Alberta	16.0		15.0		16.6	
British Columbia	16.2		15.2		16.9	
Territories	15.2		14.5		15.7	

*Total scores of the 10-item Kessler Psychological Distress Scale range from 10 (no distress) to 50 (severe distress).

Table 3 (part 1 of 2): Prevalence of lifetime suicidal ideations and suicide attempts among Indigenous peoples living off-reserve (n = 14 410)

Characteristic	Lifetime suicidal ideation						Lifetime suicide attempt					
	Total		Men		Women		Total		Men		Women	
	%	p value	%	p value	%	p value	%	p value	%	p value	%	p value
Total prevalence	19.4		16.1		21.9		2.2		2.0		2.3	
Demographic variable												
Sex												
Male	16.1	< 0.001					2.0	0.002				
Female	21.9						2.3					
Marital status												
Married	15.4	< 0.001	12.9	< 0.001	17.6	< 0.001	1.4	< 0.001	NR		1.4	< 0.001
Divorced or widowed	27.8		22.9		29.6		2.0		NR		2.2	
Single	22.2		19.8		24.1		3.7		NR		4.0	
Cultural group												
Métis	17.5	< 0.001	13.8	< 0.001	20.5	< 0.001	1.7	< 0.001	1.2	< 0.001	2.2	< 0.001
Status First Nations	21.3		18.8		23.5		2.4		2.5		2.4	
Non-status First Nations	19.6		16.2		22.2		2.7		3.5		2.0	
Inuit	22.7		20.7		24.3		3.2		1.6		4.5	
Socioeconomic variable												
Education level												
≤ Grade 8	14.8	< 0.001	15.1	< 0.001	14.6	< 0.001	1.7	< 0.001	2.5	< 0.001	0.9	< 0.001
Grades 9–10	23.3		21.1		25.2		4.1		3.3		4.8	
Grade 11–secondary completed	18.5		15.3		21.2		2.1		2.0		2.2	
Some postsecondary	20.7		18.9		22.2		2.3		1.9		2.7	
Postsecondary degree/diploma	19.0		14.1		22.4		1.8		1.6		1.9	
Employment status												
Employed	17.5	< 0.001	15.5	< 0.001	19.1	< 0.001	1.6	< 0.001	1.5	< 0.001	1.6	< 0.001
Not in the labour force	23.4		18.9		25.6		3.5		3.7		3.4	
Unemployed	21.3		15.0		27.2		2.7		2.0		3.3	
Household crowding												
Rooms per capita ≤ 2	21.4	< 0.001	17.8	< 0.001	24.0	< 0.001	2.6	< 0.001	NR		2.8	< 0.001
Rooms per capita > 2 to 4	17.4		13.8		20.1		1.8		NR		1.7	
Rooms per capita > 4	16.1		15.5		16.6		1.6		NR		1.6	
Housing maintenance												
Regular	17	< 0.001	14.5	< 0.001	18.9	< 0.001	1.6	< 0.001	1.4	< 0.001	1.7	< 0.001
Minor	20.0		17.1		22.5		2.4		2.4		2.4	
Major	27.4		20.3		32.1		4.0		3.2		4.5	
Food security												
High	14.8	< 0.001	12.5	< 0.001	16.7	< 0.001	1.2	< 0.001	1.4	< 0.001	1.1	< 0.001
Low	34.4		30.6		36.9		3.8		2.2		5.0	
Very low	44.4		43.1		45.0		9.3		9.9		9.0	
Behavioural variable												
Drinking habit												
Regular drinker (yes)	16.7	< 0.001	14.5	< 0.001	18.9	< 0.001	2.2	0.8	2.0	0.9	2.4	0.3
Regular drinker (no)	22.9		19.2		24.9		2.2		2.0		2.3	
Smoking habit												
Daily tobacco use (yes)	27.8	< 0.001	25.1	< 0.001	29.8	< 0.001	3.8	< 0.001	3.6	< 0.001	4.0	< 0.001
Daily tobacco use (no)	15.6		12.1		18.3		1.4		1.3		1.6	

Table 3 (part 2 of 2): Prevalence of lifetime suicidal ideations and suicide attempts among Indigenous peoples living off-reserve (n = 14 410)

Characteristic	Lifetime suicidal ideation						Lifetime suicide attempt					
	Total		Men		Women		Total		Men		Women	
	%	p value	%	p value	%	p value	%	p value	%	p value	%	p value
Social connectedness variable												
Strong extended family tie (yes)	15.7	< 0.001	11.2	< 0.001	18.6	< 0.001	1.2	< 0.001	1.0	< 0.001	1.3	< 0.001
Strong extended family tie (no)	23.2		20.4		25.8		3.2		2.8		3.6	
No one to turn to for support (yes)	27.0	< 0.001	20.6	< 0.001	35.1	< 0.001	5.7	< 0.001	4.2	< 0.001	7.5	< 0.001
No one to turn to for support (no)	19.0		15.8		21.4		2.0		1.8		2.1	
Other cultural variable												
Cultural engagement												
Clothing or footwear (yes)	30.2	< 0.001	33.2	< 0.001	29.8	< 0.001	3.2	< 0.001	6.6	< 0.001	2.7	0.002
Clothing or footwear (no)	18.2		15.5		20.5		2.1		1.8		2.2	
Art craft (yes)	27.6	< 0.001	23.2	< 0.001	29.8	< 0.001	2.8	< 0.001	1.9	0.5	3.2	< 0.001
Art craft (no)	16.1		14.1		17.9		1.9		2.0		1.9	
Hunting/fishing/trapping (yes)	17.6	< 0.001	14.9	< 0.001	21.5	0.2	2.2	0.7	2.3	< 0.001	2.1	0.006
Hunting/fishing/trapping (no)	20.4		17.3		22.0		2.2		1.7		2.4	
Plant gathering (yes)	17.7	< 0.001	15.4	< 0.001	19.6	< 0.001	2.1	0.001	2.1	0.06	2.1	< 0.001
Plant gathering (no)	23.1		18.0		26.4		2.4		1.7		2.9	
Language												
Speak Indigenous language (yes)	20.8	< 0.001	17.6	< 0.001	22.7	0.06	2.5	< 0.001	1.7	0.01	3.1	< 0.001
Speak Indigenous language (no)	19.2		15.9		21.8		2.1		2.0		2.2	
Residential school variable												
Not attended	17.0	< 0.001	14.0	< 0.001	19.3	< 0.001	1.6	< 0.001	1.7	< 0.001	1.6	< 0.001
Any family member attended	24.3		20.2		26.9		3.4		3.0		3.7	
Missing	26.6		24.0		28.4		3.5		1.7		4.8	
Geographical variable												
Urbanicity												
Rural	15.5	< 0.001	13.7	< 0.001	17.1	< 0.001	1.8	< 0.001	2.1	< 0.001	1.5	< 0.001
Small population centre	17.5		15.3		19.3		1.9		2.3		1.6	
Medium population centre	22.1		16.6		25.6		3.4		2.9		3.7	
Urban	21.5		17.7		24.3		2.2		1.5		2.7	
Region												
Atlantic provinces	12.0	< 0.001	8.5	< 0.001	14.4	< 0.001	0.8	< 0.001	NR		1.3	< 0.001
Quebec	22.3		22.2		22.4		2.4		NR		1.8	
Ontario	20.0		16.2		22.9		2.5		NR		2.6	
Manitoba	15.6		13.6		17.1		2.5		NR		1.9	
Saskatchewan	17.3		12.2		20.8		1.5		NR		2.0	
Alberta	21.6		16.4		25.5		2.1		NR		3.3	
British Columbia	21.3		17.3		24.4		2.3		NR		2.0	
Territories	21.2		21.8		20.8		2.7		NR		3.5	

Note: NR = not reported.*

*Values are not reported per the data disclosure policy of Statistics Canada's Research Data Centres for small cell sizes (fewer than 10 unweighted individuals with the outcome variable in 1 of the subgroups of each categorical variables).

Table 4 (part 1 of 2): Psychological distress and suicidal behaviours among Indigenous peoples living off-reserve, by income quartile (n = 14 410)

Variable	Mean score on the K10 or prevalence of suicidal behaviours, by income quartile				C or C _n (95% CI)*
	First (lowest)	Second	Third	Fourth (highest)	
Psychological distress (mean score on the K10)					C
Total (both sexes)					
All Indigenous groups	18.4	16.1	15.4	14.3	-0.054 (-0.057 to -0.050)
Métis	18.2	15.9	15.2	14.3	-0.054 (-0.060 to -0.048)
Status First Nations	18.1	16.0	15.6	14.5	-0.069 (-0.082 to -0.057)
Non-status First Nations	20.2	16.3	15.9	14.6	-0.049 (-0.056 to -0.042)
Inuit	17.1	15.4	14.9	14.2	-0.039 (-0.048 to -0.030)
Men					
All Indigenous groups	16.9	15.3	14.8	13.7	-0.046 (-0.051 to -0.040)
Métis	17.1	15.2	14.3	13.6	-0.052 (-0.060 to -0.044)
Status First Nations	16.3	15.6	15.3	13.9	-0.059 (-0.076 to -0.041)
Non-status First Nations	18.4	15.5	14.0	14.3	-0.032 (-0.042 to -0.022)
Inuit	15.3	15.3	14.5	13.2	-0.032 (-0.045 to -0.019)
Women					
All Indigenous groups	19.4	16.6	16.0	14.9	-0.055 (-0.060 to -0.050)
Métis	19.0	16.3	16.1	15.0	-0.050 (-0.058 to -0.042)
Status First Nations	19.3	16.7	15.6	14.8	-0.073 (-0.090 to -0.057)
Non-status First Nations	21.1	17.6	17.1	14.8	-0.057 (-0.066 to -0.048)
Inuit	18.4	15.6	15.3	14.8	-0.044 (-0.057 to -0.031)
Lifetime suicidal ideation (prevalence, %)					C_n
Total (both sexes)					
All Indigenous groups	27.7	21.4	15.2	13.1	-0.218 (-0.242 to -0.194)
Métis	27.3	16.5	13.8	12.1	-0.236 (-0.274 to -0.198)
Status First Nations	27.0	24.3	18.0	16.0	-0.269 (-0.343 to -0.196)
Non-status First Nations	30.8	22.0	13.5	12.0	-0.165 (-0.205 to -0.125)
Inuit	31.5	21.5	20.2	17.8	-0.153 (-0.208 to -0.098)
Men					
All Indigenous groups	24.0	16.6	13.7	10.1	-0.229 (-0.267 to -0.191)
Métis	23.2	10.8	11.9	9.1	-0.237 (-0.298 to -0.176)
Status First Nations	23.1	20.1	18.2	13.9	-0.378 (-0.496 to -0.260)
Non-status First Nations	31.1	15.1	10.5	7.9	-0.141 (-0.205 to -0.077)
Inuit	26.7	23.1	17.2	15.8	-0.151 (-0.236 to -0.066)
Women					
All Indigenous groups	29.4	25.1	17.6	15.2	-0.196 (-0.227 to -0.165)
Métis	30.6	20.2	15.5	15.7	-0.215 (-0.264 to -0.166)
Status First Nations	30.2	26.1	20.8	15.1	-0.197 (-0.291 to -0.103)
Non-status First Nations	30.9	24.9	17.6	15.2	-0.167 (-0.219 to -0.115)
Inuit	34.9	20.9	21.5	20.2	-0.153 (-0.226 to -0.080)

Table 4 (part 2 of 2): Psychological distress and suicidal behaviours among Indigenous peoples living off-reserve, by income quartile (n = 14 410)

Variable	Mean score on the K10 or prevalence of suicidal behaviours, by income quartile				C or C _n (95% CI)*
	First (lowest)	Second	Third	Fourth (highest)	
Lifetime suicide attempt (prevalence, %)					C_n
Total (both sexes)					
All Indigenous groups	4.5	1.8	1.3	1.1	-0.327 (-0.391 to -0.263)
Métis	3.7	1.2	1.3	0.7	-0.354 (-0.467 to -0.241)
Status First Nations	4.3	2.6	1.5	1.3	-0.382 (-0.565 to -0.199)
Non-status First Nations	NR	NR	NR	NR	-0.280 (-0.388 to -0.172)
Inuit	4.5	3.0	3.1	2.3	-0.171 (-0.303 to -0.039)
Men					
All Indigenous groups	4.8	1.5	1.1	0.5	-0.462 (-0.562 to -0.362)
Métis	NR	NR	NR	NR	-0.506 (-0.706 to -0.306)
Status First Nations	NR	NR	NR	NR	-0.629 (-0.868 to -0.390)
Non-status First Nations	NR	NR	NR	NR	-0.325 (-0.486 to -0.164)
Inuit	NR	NR	NR	NR	-0.341 (-0.619 to -0.063)
Women					
All Indigenous groups	4.1	1.8	1.5	1.8	-0.236 (-0.320 to -0.152)
Métis	4.4	1.0	1.7	1.4	-0.269 (-0.407 to -0.131)
Status First Nations	3.6	3.0	1.6	1.3	-0.128 (-0.408 to 0.152)
Non-status First Nations	NR	NR	NR	NR	-0.242 (-0.387 to -0.097)
Inuit	NR	NR	NR	NR	-0.126 (-0.278 to 0.026)

Note: C = concentration index, CI = confidence interval, C_n = normalized concentration index, K10 = 10-item Kessler Psychological Distress Scale, NR = not reported.†
 *A negative value of the C indicates that the health outcome is disproportionately concentrated among those with lower income.
 †Values are not reported per the data disclosure policy of Statistics Canada's Research Data Centres for small cell sizes (fewer than 10 unweighted individuals with the outcome variable in 1 of the income quartiles).

3.2%; women: 20.2%) of the income-related inequalities in psychological distress, lifetime suicidal ideation and lifetime suicide attempt, respectively. The negative contribution of food insecurity to the C and C_n suggests that food insecurity increases the concentration of mental health outcomes among low-income Indigenous peoples in Canada.

Moreover, the income variable itself contributed negatively to income-related inequalities in psychological distress and lifetime suicidal ideation for men and women. Income accounted for 13.7% (men: 12.9%; women: 14.0%) of income-related inequalities in psychological distress, 18.2% (men: 20.1%; women: 17.6%) of those in lifetime suicidal ideation, and 7.9% of those in suicide attempt among men. Employment status explained 13.5% (men: 11.1%; women: 14.9%) of income-related inequalities in psychological distress and 7.2% (men: 3.1%; women: 7.9%) of income-related inequalities in suicide attempt. Unexplained variables accounted for a residual 5.5% (men: 16.3%; women: -0.5%) of income-related inequalities in psychological distress, but 20.3% (men: 31.7%; women: 12.8%) of income-related inequalities in suicidal ideation and 63.0% (men: 79.7%; women: 63.7%) of income-related inequalities in suicide attempt.

Interpretation

We showed high prevalence rates of psychological distress, lifetime suicidal ideation and suicide attempt among Indigenous peoples living off-reserve in Canada in 2012. Income-related inequality in psychological distress was higher among women than men, while income-related inequalities in suicidal behaviours were higher among men. Across the 4 groups compared, income-related inequalities in mental health outcomes were greater among status First Nations men and Métis women.

The results of our study are consistent with those of an analysis in Saskatchewan, which showed higher household income to be a protective factor against lifetime suicidal ideation among Indigenous peoples.⁴⁹ Our results are also consistent with the findings of previous studies examining associations between income and mental health outcomes among non-Indigenous populations. A 2005 study involving 200 low-income African Americans found that life hassles (defined as work and time pressure), social and cultural difficulties, finances, and social acceptability and victimization, were all independently significant risk factors for suicide attempt.⁵⁰ A case-control study in New York

Table 5: Absolute (%)* contribution of determinants to income-related inequalities in psychological distress and suicidal behaviours among Indigenous peoples living off-reserve (n = 14 410)

Determinants†	Psychological distress			Lifetime suicidal ideation			Lifetime suicide attempt		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Demographic	-0.0039 (7.2)	-0.0011 (2.5)	-0.0023 (4.1)	-0.0202 (9.3)	-0.0098 (4.3)	-0.0196 (10.0)	-0.0095 (2.9)	-0.0035 (0.8)	-0.0140 (5.9)
Cultural group	0.0014 (-2.6)	0.0009 (-1.9)	0.0016 (-2.9)	-0.0039 (1.8)	-0.0056 (2.4)	-0.0018 (0.9)	0.0008 (-0.3)	-0.0046 (1.0)	0.0037 (-1.5)
Income	-0.0074 (13.7)	-0.0059 (12.9)	-0.0077 (14.0)	-0.0397 (18.2)	-0.0461 (20.1)	-0.0344 (17.6)	-0.0255 (7.8)	-0.0367 (7.9)	0.0102 (-4.3)
Education	-0.0019 (3.5)	-0.0014 (3.0)	-0.0024 (4.3)	0.0147 (-6.7)	0.0077 (-3.4)	0.0220 (-11.2)	0.0069 (-2.1)	-0.0001 (0.2)	0.0107 (-4.5)
Employment status	-0.0073 (13.5)	-0.0051 (11.1)	-0.0082 (14.9)	-0.0024 (1.1)	0.0107 (-4.7)	-0.0127 (6.5)	-0.0235 (7.2)	-0.0141 (3.1)	-0.0186 (7.9)
Household crowding and housing condition	-0.0016 (2.9)	-0.0008 (1.7)	-0.0021 (3.9)	-0.0089 (4.1)	-0.0029 (1.2)	-0.0136 (7.0)	-0.00004 (0.01)	0.0019 (-0.4)	0.0010 (-0.4)
Food security	-0.0217 (40.2)	-0.0176 (38.4)	-0.0236 (42.9)	-0.0581 (26.7)	-0.0489 (21.4)	-0.0632 (32.2)	-0.0437 (13.4)	-0.0148 (3.2)	-0.0477 (20.2)
Behavioural factors	-0.0049 (9.0)	-0.0061 (13.2)	-0.0042 (7.7)	-0.0342 (15.7)	-0.0417 (18.2)	-0.0270 (13.8)	-0.0119 (3.6)	-0.0170 (3.7)	-0.0075 (3.2)
Social connectedness factors	-0.0017 (3.1)	-0.0010 (2.1)	-0.0029 (5.2)	-0.0044 (2.0)	-0.0050 (2.2)	-0.0060 (3.0)	-0.0081 (2.5)	-0.0055 (1.2)	-0.0092 (3.9)
Other cultural factors	-0.0003 (0.6)	-0.0001 (0.2)	-0.0001 (0.2)	-0.0075 (3.4)	-0.0056 (2.5)	-0.0016 (0.8)	0.0014 (-0.4)	0.0115 (-2.5)	-0.0033 (1.4)
Residential school	-0.0010 (1.8)	-0.0009 (2.0)	-0.0008 (1.5)	-0.0073 (3.3)	-0.0080 (3.5)	-0.0066 (3.4)	-0.0081 (2.5)	-0.0036 (0.8)	-0.0079 (3.3)
Geographical factors	-0.0009 (1.6)	0.0007 (-1.4)	-0.0025 (4.6)	-0.0017 (0.8)	-0.0011 (0.5)	-0.0064 (3.2)	0.0002 (-0.1)	-0.0070 (1.5)	-0.0032 (1.4)
Residual	-0.0030 (5.5)	-0.0075 (16.3)	0.0002 (-0.5)	-0.0443 (20.3)	-0.0727 (31.7)	-0.0251 (12.8)	-0.2059 (63.0)	-0.3684 (79.7)	-0.1503 (63.7)
C/C _n	-0.0536	-0.0455	-0.0548	-0.2181	-0.2294	-0.1960	-0.3272	-0.4623	-0.2358

Note: C = concentration index, C_n = normalized concentration index.

*Percentage contributions in parentheses were calculated by dividing the corresponding contribution value by the C/C_n. Detailed results of the decomposition analyses can be found in Appendices 1D, 1E and 1F.

†For variables within each determinant, see subsection "Explanatory variables" in the Methods.

City suggested that suicide decedents were more likely to be younger and reside in communities with high income inequality and low income per capita.⁵¹

A complex interplay of biological, social and cultural factors contribute to mental health problems.⁵² Within this complex interplay, food insecurity is recognized as one of the main factors contributing to the poor mental health outcomes within Indigenous and non-Indigenous populations.⁵³⁻⁶⁴ Data from the 2012 Canadian Community Health Survey showed that 28.2% of off-reserve Indigenous households experienced some form of food insecurity in the past year, compared with 12.6% within the overall Canadian population.⁶⁵ The decomposition results indicated that food insecurity made the largest contribution to the concentration of psychological distress and suicidal behaviours among low-income Indigenous peoples in Canada. Greater food insecurity increases probabilities of poor mental health outcomes, and food insecurity is more prevalent among the poor. The contribution of food insecurity to income-related inequalities in the 3 mental health outcomes was greater among women than men.

Based on our results, addressing food insecurity among low-income Indigenous peoples living off-reserve may potentially reduce a substantial proportion of the observed income-related inequalities in mental health outcomes. Our findings also point to the importance of household income and employment

status as contributors to income-related inequalities in the 3 mental health outcomes. The contribution of employment is important because, compared with employed Indigenous peoples, Indigenous peoples who are not in the labour force or are unemployed had higher probabilities of having mental health problems and were generally poorer.

Limitations

Our analyses have several limitations. First, the Aboriginal Peoples Survey does not collect information from individuals living in institutions (e.g., prisons and hospitals) and other collective dwellings (e.g., shelters, rooming houses and group homes), where a disproportionate number of Indigenous people reside. This exclusion omits many Indigenous peoples known to be at high-risk for adverse mental health problems.^{66,67} Second, we used the lifetime time frame to examine suicidal behaviours in the study to ensure a large enough number of respondents with outcome variables for the analyses. It would be ideal for future studies to have concurrent measures of outcome and explanatory variables. Third, some of the explanatory factors in the decomposition analysis are likely to be endogenous and may lead to unknown bias in the study. For example, endogeneity in the case of smoking behaviour can be due to the impossibility of distinguishing causality (i.e., whether smoking leads to a mental health issue or mental health issues leads to smoking). Fourth,

owing to the unavailability of these data in the Aboriginal Peoples Survey, our analyses included limited historical, cultural, and contemporary factors that are likely important determinants of Indigenous health, including the diversity of nations and cultures that exist within First Nations, Inuit and Métis peoples. Fifth, the contributions of the residual component to income-related inequalities in lifetime suicide ideation and attempt were substantial. This suggests that other factors not included in our models affect socioeconomic inequalities in mental health outcomes among Indigenous peoples. This could also be due, in part, to the less-than-optimal specification of the explanatory variables included in our models. Finally, because we used a survey of living individuals, we did not consider completed suicides, which excluded the most severe mental health outcome in our analyses.

Conclusion

We found persistent and substantial income-related inequalities in psychological distress and suicidal behaviours among Indigenous peoples living off-reserve in Canada. Indigenous peoples in Canada have high rates of mental health problems and experience some of the greatest inequalities in social determinants of health.^{4,19,20} Our findings underscore the need for greater policy attention to socioeconomic inequalities in mental health within Indigenous peoples as well as inequalities in mental health between Indigenous and non-Indigenous people. To address mental health issues faced by Indigenous peoples, policies must address a broader array of social determinants, such as food insecurity, income and employment status.

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Competing interests: Mohammad Hajizadeh, Amy Bombay and Yukiko Asada report grants from the Nova Scotia Health Research Foundation.

This article has been peer reviewed.

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Contributors: All authors contributed to the conception and design of the study. Mohammad Hajizadeh performed the statistical analysis and all authors interpreted the

results. Mohammad Hajizadeh drafted the manuscript, and Amy Bombay and Yukiko Asada contributed to drafting and revisions. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Funding: Funding for this research was provided by the Nova Scotia Health Research Foundation Establishment Grant program (grant no. 1017).

Acknowledgements: The analyses presented in this paper were conducted at the Statistics Canada's Atlantic Research Data Centre at Dalhousie University, which is part of the Canadian Research Data Centre Network. The

authors thank the Canadian Research Data Centre Network for facilitating the access to the Aboriginal Peoples Survey and the Atlantic Research Data Centre analyst Heather Hobson for her support and assistance. The authors also thank participants at the 52nd Annual Conference of the Canadian Economics Association, the 12th European Conference on Health Economics and the 2018 Canadian Association for Health Services and Policy Research for their comments and suggestions.

Accepted: Feb. 28, 2019

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