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Smoking correlates among Inuit men and women in Inuit Nunangat

by Evelyne Bougie and Dafna E. Kohen

Abstract

Background: Although rates of daily smoking among Inuit have been decreasing since 1991, Inuit are still much more likely to smoke relative to the Canadian population as a whole. However, little population-based empirical research has identified characteristics associated with cigarette use among this population.

Data and methods: Based on data from the 2012 Aboriginal Peoples Survey, sex-specific logistic regression analyses, informed by an Inuit social determinants of health framework, described associations between current smoking and selected socio-demographic characteristics among Inuit men and women aged 18 or older who resided in Inuit Nunangat.

Results: In 2012, 75% of Inuit men and 74% of Inuit women reported that they smoked cigarettes either daily or occasionally. Inuit men and women had lower odds of smoking if they were high school graduates. Among Inuit men, the odds of smoking were lower for those in higher-income households. Among Inuit women, the odds of smoking were lower for those who had postsecondary education or lived in food-secure households; odds were higher for women who had attended a residential school. Inuit of both sexes had significantly higher odds of smoking if they lived in crowded conditions or in homes where a regular smoker was present.

Interpretation: Some correlates of smoking among Inuit in Inuit Nunangat appear to be sex-specific. Findings from this study identify some of the protective and risk factors for smoking among this population and can help inform smoking prevention and cessation programs.

Keywords: Arctic Regions, cigarette use, gender-based analysis, indigenous, risk and protective factors

The high prevalence of smoking among Inuit in Canada is well-documented.[1-6] Although rates of daily smoking among Inuit appear to be decreasing,[6] they remain much higher than among the total Canadian population.[3,4] This is especially the case in Inuit Nunangat. For instance, in 2012, 63% of Inuit aged 15 or older in Inuit Nunangat reported smoking cigarettes daily, compared with 16% of the Canadian population overall.[4] Adverse health outcomes associated with smoking include cancer, respiratory illness, heart disease, and stroke.[7] Lung cancer is a growing public health concern among Inuit in the Arctic.[8]

Few empirical population-based studies have investigated factors associated with cigarette use among Inuit. Research is needed to identify characteristics of Inuit who are at risk of smoking in order to inform culturally appropriate cessation and prevention programs. Using data from the 2012 Aboriginal Peoples Survey (APS), an Inuit-specific social determinants of health framework,[5] and a gender-based analysis, the present study examines correlates of smoking among Inuit men and women aged 18 or older living in the four regions collectively known as Inuit Nunangat (Nunavik in Northern Quebec, Nunatsiavut in Northern Labrador, Nunavut, and the Inuvialuit Region of the Northwest Territories).

Smoking among Inuit: A social determinants approach

Nicotine addiction plays an important role in cigarette use, but individual, social, and economic factors also influence smoking behaviours.[9] Many researchers have emphasized the importance of examining Inuit health from a social determinants perspective[2,10] with a focus on the underlying *processes*.[11] Inuit Tapiriit Kanatami (ITK),[5] the national representational organization of Inuit in Canada, has identified 11 interrelated factors as key heath determinants: quality of early childhood development; culture and language; livelihood; income distribution; housing; personal safety and security; education; food security; availability of health services; mental wellness; and the environment. This framework has been used by others to investigate Inuit health.[12,13]

Many of these health determinants have been associated with smoking in the general population, but no studies to date have focused specifically on Inuit. For instance, smoking is related to socioeconomic factors, such as unemployment, low educational attainment, and low income, in both the general[9,14] and Aboriginal[15-17] populations. Smoking is also related to mental wellness—smoking and depression often co-occur in both the general[18] and Aboriginal[19,20] populations. Co-occurrence of smoking and alcohol addiction is frequent[21] and has been observed in the Aboriginal population as well.[15,17,22] Smoking has also been related to low social support.[16,19,23]

Other determinants of Inuit health identified in ITK's framework could be associated with smoking, but have not been empirically investigated. Overcrowding, a particular concern among Inuit,[1,4] may act as a stressor increasing the likelihood of substance abuse and other social problems.[10] A recent study reported an association between crowding and higher psychological distress among Inuit women.[12] While evidence indicates that living in a smoke-free home reduces cigarette use,[24] crowded conditions may increase exposure to smokers in the home.

Food insecurity is also well-documented among Inuit, especially in Inuit Nunangat.[1,5,25] It exists when, because of a lack of money, one or more members of a household do not have access to the variety or quantity of food that they need.[26] In some Inuit communities, the cost of store-bought healthy food is at least twice as high as in southern Canada.[1] Food insecurity among Inuit

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has been connected to socioeconomic conditions (such as unemployment and crowding), weaker extended family ties, and less favourable self-rated health,[25] as well as to higher psychological distress.[12] Because of relationships between smoking and both socioeconomic conditions and mental wellness, an association between smoking and food insecurity might also be expected.

It has been argued that cultural erosion negatively affects Aboriginal people's well-being.[27,28] Inuit culture is an important determinant of health.[5] Inuit who experience cultural continuity by participating in traditional activities might be less likely to engage in smoking behaviour, although a recent study showed the opposite to be true among off-reserve First Nations and Métis adults.[17] Another cultural factor is the legacy of the residential school system,[5] which has directly and indirectly affected Aboriginal people's health and well-being.[10,11,29,30] Because smoking may be a way to cope with stress, distress, and disadvantage,[19,23] each of which has been related to residential schooling,[29] an association might exist between cigarette use and residential school experiences.

Based on availability in the 2012 APS, the present study uses an Inuit-specific health framework[5] to analyze smoking in the context of labour force status, participation in traditional activities, education, household income, crowding, presence of a regular smoker in the home, strength of family ties, food security, diagnosed mood and/or anxiety conditions, heavy drinking, and residential school experiences. In line with calls for gender-based analysis in health and tobacco research,[31,32] factors associated with smoking were examined separately for Inuit men and women.

What is already known on this subject?

- A recent analysis suggests that rates of daily smoking among Inuit have been decreasing since 1991.
- Inuit—particularly those in Inuit Nunangat—are still much more likely to smoke relative to the Canadian population as a whole.
- Little empirical population-based research has investigated characteristics associated with cigarette use among Inuit in Inuit Nunangat.

What does this study add?

- This study used the 2012 Aboriginal Peoples Survey, a gender-based analytical approach, and an Inuit-specific social-determinants-of-health framework to examine characteristics associated with smoking among Inuit men and women aged 18 or older who lived in Inuit Nunangat.
- High school graduation was a protective factor for both Inuit men and women.
- Among Inuit men, living in higher-income households was also protective; among Inuit women, having postsecondary education and living in food-secure households were protective.
- Living in crowded conditions or in a home where a regular smoker was present were risk factors for smoking among Inuit of both sexes; a risk factor specific to Inuit women was having personally attended a residential school.

Methods

Data

The 2012 APS is a nationally representative cross-sectional survey of First Nations people living off reserve, Métis, and Inuit, developed by Statistics Canada. Participation was voluntary. Data were collected directly from respondents through personal interviews or through computer-assisted interviews. Interviews by proxy were allowed. The overall response rate for Inuit Nunangat was 76%. Response rates for the individual regions were: Nunatsiavut, 81%; Nunavik, 77%; Nunavut, 75%; and the Inuvialuit Region, 71%.

Study sample

The study sample consisted of APS respondents aged 18 or older who self-identified as Inuit and who were living in Inuit Nunangat at the time of data collection. About 7% of the initial study sample had missing smoking data and were excluded. The sample size was 2,614 Inuit—1,263 men (mean age 36.7) and 1,351 women (mean age 38.8). About 7% resided in Nunatsiavut, 22% in Nunavik, 62% in Nunavut, and 9% in the Inuvialuit Region. Around 11% were interviewed by proxy. Percentages of missing data for smoking status were similar for proxy and non-proxy respondents, although smoking prevalence rates were lower among proxy than non-proxy respondents (data not shown).

Measures

The APS smoking question was: "At the present time do you smoke cigarettes daily, occasionally, or not at all?" The dependent variable for this study was being a current smoker (daily or occasional) versus being a non-smoker. This way of categorizing smokers is in line with recent research that used the 2012 APS to examine smoking among off-reserve First Nations and Métis adults.[17]

Respondents' labour force status during the APS reference week was coded as "employed," "unemployed," or "not in labour force." Employed persons were those who, during the reference week, did any paid work. Unemployed persons were those who were looking for work, were on temporary layoff, or had a job to start within four weeks. Persons not in the labour force were neither employed nor unemployed, including those who were either unable to work or unavailable for work (for example, retirees, homemakers, students, or persons permanently unable to work).

Participation in traditional activities (yes/no) indicated whether, in the past year, respondents had done any of the following: made clothing or footwear;

arts or crafts; hunted, fished, or trapped; gathered wild plants.

Education was coded as "currently attending school" or highest level attained: "less than high school," "high school," or "postsecondary education."

Household income was operationalized as the after-tax income (in dollars) of all household members, adjusted by a factor accounting for household size.

Household crowding was coded binary (yes/no) to indicate whether respondents lived in dwellings with more than one person per room.[33]

Regular smoker in the home (yes/no) indicated whether respondents reported anyone smoking inside their home every day or almost every day.

Strength of family ties was measured with the question: "On a scale from 1 to 5, how strong are the ties among members of your family living in your city, town or community but in another household?", coded as "stronger" (5 or 4) or "weaker" (3, 2, or 1). Research has shown the importance of strong family ties for Inuit health,[12,13] but the studies did not pertain specifically to smoking.

Food security was measured using the U.S. Household Food Security Survey Module Six-Item Short Form[34] and coded as "high or marginal" or "low or very low."

Diagnosed mood and/or anxiety disorder was coded as binary (yes/no) if respondents reported having ever been diagnosed with a mood disorder (such as depression, bipolar disorder, mania, or dysthymia) and/or an anxiety disorder (such as a phobia, obsessive-compulsive disorder or a panic disorder).

Heavy drinking was defined as five or more drinks on a single occasion at least once a month in the past 12 months (yes/no). This definition is not consistent with drinking guidelines for women,[35] but it has been used in past research using the APS.[16,17]

Because the residential school experiences derived variable on the APS master file had very high rates of missing data, two indicators were created for this study. The first indicated whether respondents had personally attended a residential school (yes/no); the second, whether respondents' parents (mother and/or father) had attended a residential school (yes/no/don't know).

The percentages of missing data for the independent variables ranged between 0.2% and 6%. Missing data were excluded from the denominator for descriptive analyses and from the multivariate analysis. A total of 1,001 Inuit men and 1,093 Inuit women had valid data on all independent variables.

As expected, several independent variables were correlated—but not highly. Correlation coefficients for the overall sample ranged from 0.01 to 0.27. The strongest were between being employed and household income (0.27); being employed and food security (0.21); household income and not being in the labour force (-0.22); household income and not having a high school diploma (-0.23); household income and food security (0.28); and not being in the labour force and not having a high school diploma (0.20). Preliminary analyses showed no concern for collinearity among selected independent variables, with all tolerance values over 0.50[36] and all variance inflation factor values under 2.[37]

Analyses

Smoking prevalence rates for Inuit men and women were calculated overall and by age group (18 to 24, 25 to 54, and 55 or older) and Inuit region. Preliminary regression analyses (not shown) found better model fit and more similar results when occasional smokers were combined with daily smokers (as opposed to combined with non-smokers or excluded from the model). Bivariate logistic regression analyses examined the unique association of each socio-demographic

Table 1
Smoking prevalence by sex, age group and Inuit region of residence, Inuit population aged 18 or older in Inuit Nunangat, 2012

				Age group									Region of residence											
	Total			18 to 24			25 to 54			55 or older			Nunavut			Nunavik			Nunatsiavut			Inuvialuit Region		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
Sex and smoking status	%	from	to	%	from	to	%	from	to	%	from	to	%	from	to	%	from	to	%	from	to	%	from	to
Men																								
Current smoker	74.9	71.8	77.8	79.5	74.4	83.7	79.4	75.9	82.5	41.2	30.2	53.2	75.8	71.0	80.0	77.3	72.5	81.5	64.4	57.8	70.4	71.7	65.3	77.4
Daily	63.8	60.5	67.0	64.5	58.8	69.9	70.0	66.0	73.7	28.8[E]	20.0	39.6	64.3	59.4	69.0	68.5	63.4	73.2	51.8	45.3	58.3	58.4	51.5	65.0
Occasional	11.1	9.2	13.4	14.9	11.3	19.5	9.4	7.2	12.2	12.4[E]	6.5	22.4	11.4	8.6	15.0	8.8[E]	6.3	12.3	12.5[E]	8.7	17.8	13.3[E]	9.3	18.7
Current non-smoker	25.1	22.2	28.2	20.5	16.3	25.6	20.6	17.5	24.1	58.8	46.8	69.8	24.2	20.0	29.0	22.7	18.5	27.5	35.6	29.6	42.2	28.3	22.6	34.7
Women																								
Current smoker	73.6	70.3	76.7	80.1	75.0	84.3	80.3	77.3	83.0	43.0	32.4	54.2	73.8	69.0	78.1	77.7	73.0	81.8	61.5	55.1	67.5	71.5	65.4	76.9
Daily	64.2	60.9	67.4	69.6	63.9	74.8	69.6	65.8	73.0	39.2	29.3	50.1	64.6	59.8	69.1	67.9	62.8	72.5	52.5	45.9	58.9	61.0	54.4	67.2
Occasional	9.4	7.6	11.7	10.5[E]	7.1	15.1	10.7	8.2	13.9	F	F	F	9.2	6.6	12.6	9.8	7.2	13.3	9.0[E]	6.1	13.1	10.5[E]	7.2	15.2
Current non-smoker	26.4	23.3	29.7	19.9	15.7	25.0	19.7	17.0	22.7	57.0	45.8	67.6	26.2	21.9	31.0	22.3	18.2	27.0	38.5	32.5	44.9	28.5	23.1	34.6

[E] use with caution
F too unreliable to be published
Source: 2012 Aboriginal Peoples Survey.

Table 2
Percentage distribution, by sex, smoking status and selected socio-demographic characteristics and odds ratios relating current smoking to selected socio-demographic characteristics, Inuit men aged 18 or older in Inuit Nunangat, 2012

				Current smoker (daily or occasional)								
	Total			Yes			No					
Socio-demographic characteristics	%	95% confidence interval from	to	%	95% confidence interval from	to	%	95% confidence interval from	to	Odds ratio	95% confidence interval from	to
Labour force status												
Employed†	51.1	47.7	54.6	50.2	46.2	54.2	53.9	46.7	60.9	1.00	...	...
Unemployed	16.1	13.8	18.8	18.0	15.3	21.1	10.4E	6.6	16.1	1.86*	1.06	3.27
Not in labour force	32.8	29.6	36.1	31.8	28.1	35.6	35.7	29.5	42.4	0.95	0.67	1.35
Participated in traditional activities in past year												
Yes	90.4	88.5	92.1	90.4	88.0	92.3	90.6	86.9	93.4	0.97	0.62	1.51
No†	9.6	7.9	11.5	9.6	7.7	12.0	9.4E	6.6	13.1	1.00	...	...
Highest level of education												
Currently attending school	3.8E	2.7	5.3	4.4E	3.0	6.3	F	F	F	1.75	0.72	4.23
Less than high school†	50.1	46.7	53.6	51.3	47.3	55.3	46.8	39.6	54.0	1.00	...	...
High school diploma	11.2	9.5	13.2	9.9	8.0	12.2	15.2	11.7	19.5	0.60*	0.39	0.91
Postsecondary diploma	34.8	31.6	38.2	34.5	30.7	38.4	35.8	29.6	42.5	0.88	0.61	1.27
Household crowding												
Yes	45.0	41.6	48.5	47.6	43.5	51.7	37.3	30.8	44.2	1.53*	1.09	2.14
No†	55.0	51.5	58.4	52.4	48.3	56.5	62.7	55.8	69.2	1.00	...	...
Regular smoker in home												
Yes	32.6	29.3	36.0	36.8	32.9	41.0	20.9	16.1	26.7	2.20*	1.53	3.17
No†	67.4	64.0	70.7	63.2	59.0	67.1	79.1	73.3	83.9	1.00	...	...
Family ties												
Stronger	70.0	66.6	73.1	69.3	65.5	72.9	71.9	64.7	78.1	0.88	0.60	1.29
Weaker†	30.0	26.9	33.4	30.7	27.1	34.5	28.1	21.9	35.3	1.00	...	...
Household food security												
High or marginal	48.4	44.6	52.1	45.5	41.2	49.9	56.8	49.5	63.8	0.64*	0.45	0.89
Low or very low†	51.6	47.9	55.4	54.5	50.1	58.8	43.2	36.2	50.5	1.00	...	...
Diagnosed mood and or anxiety disorder												
Yes	5.9	4.4	7.8	6.5	4.7	9.0	4.1E	2.3	7.1	1.66	0.83	3.30
No†	94.1	92.2	95.6	93.5	91.0	95.3	95.9	92.9	97.7	1.00	...	...
Heavy drinking												
Yes	31.9	28.9	35.1	33.8	30.2	37.7	26.2	21.3	31.8	1.44*	1.05	1.98
No†	68.1	64.9	71.1	66.2	62.3	69.8	73.8	68.2	78.7	1.00	...	...
Personal residential school experience												
Yes	21.6	18.7	24.8	20.0	16.8	23.6	26.4	20.7	33.1	0.70	0.48	1.01
No†	78.4	75.2	81.3	80.0	76.4	83.2	73.6	66.9	79.3	1.00	...	...
Parental residential school experience												
Yes	42.7	39.3	46.3	43.9	39.9	48.0	39.0	32.3	46.2	1.40	0.99	2.00
No†	47.3	43.8	50.9	44.6	40.5	48.8	55.6	48.3	62.7	1.00	...	...
Don't know	9.9	8.1	12.2	11.5	9.1	14.3	5.4E	2.9	9.8	2.64*	1.29	5.40
Household income (after-tax, adjusted $)	**Mean $**	**SE**		**Mean $**	**SE**		**Mean $**	**SE**				
	35,191	715		32,785	798		42,382	1,535		0.77*	0.69	0.86

... not applicable
E use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)
† reference group
Source: 2012 Aboriginal Peoples Survey.

characteristic with smoking. Multivariate logistic regression analyses examined the association of each socio-demographic characteristic with smoking when the other covariates were held constant. The full model included all socio-demographic characteristics and was adjusted for age, Inuit region, and proxy reporting. Sampling weights were applied to account for the sample design, non-response, and known population totals. A bootstrapping technique with Fay adjustment was used when calculating estimates of variance.[38] Statistical significance was set at < 0.05 for all analyses.

Results

Smoking prevalence

In 2012, 75% of Inuit men and 74% of Inuit women aged 18 or older in Inuit Nunangat reported that they smoked. Most were daily smokers—the daily/occasional breakdown was 64% and 11% for men, and 64% and 9% for women (Table 1). A chi-square test showed no significant sex difference in the distribution of smoking prevalence rates ($\chi^2 = 1.3$, $p = 0.51$).

Smoking prevalence rates were distributed differently across age groups ($\chi^2 = 75.7$, $p < 0.0001$ for men and $\chi^2 = 80.2$, $p < 0.0001$ for women), with Inuit men and women aged 55 or older being more likely to be non-smokers. Smoking prevalence rates were also distributed differently across the four Inuit regions ($\chi^2 = 14.0$, $p < 0.05$ for men and $\chi^2 = 13.1$, $p < 0.05$ for women)—residents of Nunatsiavut were generally more likely to be non-smokers.

Bivariate analyses

The odds of smoking were significantly lower among Inuit who lived in food-secure households or in higher-income households (Tables 2 and 3). Among Inuit men, the odds of smoking were significantly lower for those who had a high school diploma. Among both sexes, the odds were significantly higher for those who were unemployed, lived in crowded conditions, lived in homes where a regular smoker was present, and engaged in heavy drinking. Parental residential school experience was also significant:

the odds of smoking were higher among Inuit women whose parents had attended residential school (versus those whose parents had not), and among Inuit men who did not know if their parents had attended residential school (versus those whose parents had not).

Multivariate logistic regression analyses

When all the selected socio-demographic characteristics were taken into account (Table 4), significantly lower odds of smoking were observed among Inuit men who lived in higher-income households (OR = 0.85: 95% CI: 0.75 to 0.97). Relative to men who did not have a high school diploma, those who were high school graduates had significantly lower odds of smoking (OR = 0.53; 95% CI: 0.31 to 0.89). Inuit men had significantly higher odds of smoking if they lived in crowded conditions (OR = 1.5; 95% CI: 1.01 to 2.31) or in homes where a regular smoker was present (OR = 1.9; 95% CI: 1.23 to 2.82).

When all the selected socio-demographic characteristics were held constant, the odds of smoking were significantly lower for Inuit women in food-secure households (OR = 0.41; 95% CI: 0.27 to 0.62) (Table 4). Relative to women who were not high school graduates, those with a high school diploma (OR = 0.47, 95% CI: 0.28 to 0.78) or postsecondary education (OR = 0.59; 95% CI: 0.38 to 0.91) had significantly lower odds of smoking. The odds of smoking were significantly higher for Inuit women living in crowded conditions (OR = 1.6; 95% CI: 1.02 to 2.36) or in homes where a regular smoker was present (OR = 2.3; 95% CI: 1.43 to 3.59). Relative to those who had not personally attended a residential school, Inuit women who reported having done so had significantly higher odds of smoking (OR = 2.4; 95% CI: 1.28 to 4.33).

The bivariate associations between smoking and being unemployed, smoking and heavy drinking, and smoking and parental residential school experience were no longer significant in the multivariate analyses.

Table 3
Percentage distribution, by sex, smoking status and selected socio-demographic characteristics and odds ratios relating current smoking to selected socio-demographic characteristics, Inuit women aged 18 or older in Inuit Nunangat, 2012

				Current smoker (daily or occasional)								
	Overall			Yes			No					
		95% confidence interval			95% confidence interval			95% confidence interval		Odds	95% confidence interval	
Socio-demographic characteristics	%	from	to	%	from	to	%	from	to	ratio	from	to
Labour force status												
Employed†	52.9	49.1	56.6	52.3	48.0	56.5	54.5	47.1	61.6	1.00	...	...
Unemployed	9.7	7.8	12.0	11.5	9.0	14.5	4.7[E]	2.8	8.0	2.52*	1.36	4.65
Not in labour force	37.4	33.9	41.1	36.2	32.3	40.4	40.8	33.6	48.4	0.93	0.65	1.32
Participated in traditional activities in past year												
Yes	88.8	86.6	90.7	87.7	84.9	90.0	92.0	88.0	94.7	0.62	0.37	1.03
No†	11.2	9.3	13.4	12.3	10.0	15.1	8.0[E]	5.3	12.0	1.00	...	...
Highest level of education												
Currently attending school	2.3[E]	1.6	3.4	2.4[E]	1.5	3.7	F	F	F	1.00	0.39	2.56
Less than high school†	54.2	50.9	57.5	56.2	52.3	59.9	48.9	41.8	56.0	1.00	...	...
High school diploma	12.5	10.7	14.5	12.2	10.2	14.5	13.3	10.0	17.4	0.80	0.52	1.22
Postsecondary diploma	31.0	28.1	34.0	29.3	26.0	32.8	35.8	29.7	42.3	0.71	0.50	1.02
Household crowding												
Yes	46.2	42.6	49.7	49.3	45.1	53.4	37.5	30.6	45.0	1.62*	1.14	2.30
No†	53.8	50.3	57.4	50.7	46.6	54.9	62.5	55.0	69.4	1.00	...	...
Regular smoker in home												
Yes	26.0	23.0	29.3	29.7	26.1	33.6	16.0[E]	11.0	22.7	2.21*	1.38	3.55
No†	74.0	70.7	77.0	70.3	66.4	73.9	84.0	77.3	89.0	1.00	...	...
Family ties												
Stronger	72.0	68.5	75.3	70.7	66.5	74.5	75.7	68.7	81.6	0.77	0.52	1.15
Weaker†	28.0	24.7	31.5	29.3	25.5	33.5	24.3	18.4	31.3	1.00	...	...
Household food security												
High or marginal	46.2	42.6	49.9	40.7	36.7	44.8	61.8	54.1	68.9	0.43*	0.30	0.61
Low or very low†	53.8	50.1	57.4	59.3	55.2	63.3	38.2	31.1	45.9	1.00	...	...
Diagnosed mood and/or anxiety disorder												
Yes	8.0	6.3	10.0	8.0	6.1	10.5	7.8[E]	4.9	12.4	1.02	0.57	1.84
No†	92.0	90.0	93.7	92.0	89.5	93.9	92.2	87.6	95.1	1.00	...	...
Heavy drinking												
Yes	25.3	22.6	28.2	28.7	25.3	32.4	15.9	12.3	20.3	2.14*	1.51	3.03
No†	74.7	71.8	77.4	71.3	67.6	74.7	84.1	79.7	87.7	1.00	...	...
Personal residential school experience												
Yes	20.2	17.4	23.3	20.5	17.3	24.1	19.4	14.2	25.9	1.07	0.70	1.64
No†	79.8	76.7	82.6	79.5	75.9	82.7	80.6	74.1	85.8	1.00	...	...
Parental residential school experience												
Yes	37.4	34.3	40.5	40.0	36.2	43.9	30.1	25.1	35.7	1.67*	1.22	2.29
No†	52.2	48.5	55.8	48.8	44.6	53.0	61.4	54.5	67.9	1.00	...	...
Don't know	10.5	7.9	13.7	11.2	8.4	14.8	8.5[E]	4.4	15.7	1.66	0.77	3.62
Household income (after-tax, adjusted)	**Mean $**	**SE**		**Mean $**	**SE**		**Mean $**	**SE**				
	36,978	779		35,103	897		42,218	1,565		0.83*	0.75	0.92

... not applicable
[E] use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)
† reference group
Source: 2012 Aboriginal Peoples Survey.

Table 4
Adjusted odds ratios relating selected socio-demographic characteristics to current smoking, by sex, Inuit population aged 18 or older in Inuit Nunangat, 2012

	Men†			Women‡		
		95% confidence interval			95% confidence interval	
Socio-demographic characteristic	Adjusted§ odds ratio	from	to	Adjusted§ odds ratio	from	to
Labour force status						
Employed††	1.00	...	...	1.00	...	...
Unemployed	1.23	0.65	2.33	1.39	0.67	2.87
Not in labour force	0.93	0.61	1.42	0.80	0.53	1.20
Participated in traditional activities in past year‡‡	1.14	0.68	1.91	0.64	0.33	1.22
Education						
Currently attending	0.90	0.31	2.63	0.49	0.15	1.61
Less than high school††	1.00	...	...	1.00	...	...
High school diploma	0.53*	0.31	0.89	0.47*	0.28	0.78
Postsecondary diploma	1.09	0.70	1.69	0.59*	0.38	0.91
Household income quintile (adjusted, after-tax)	0.85*	0.75	0.97	0.96	0.84	1.11
Household crowding‡‡	1.53*	1.01	2.31	1.55*	1.02	2.36
Regular smoker in home‡‡	1.86*	1.23	2.82	2.27*	1.43	3.59
Stronger family ties‡‡	1.06	0.68	1.65	1.24	0.80	1.92
High household food security‡‡	0.79	0.53	1.18	0.41*	0.27	0.62
Diagnosed mood and/or anxiety disorder‡‡	2.33	0.95	5.73	0.88	0.48	1.61
Heavy drinking‡‡	1.40	0.96	2.03	1.38	0.92	2.08
Personal residential school experience‡‡	1.26	0.72	2.21	2.35*	1.28	4.33
Parental residential school experience						
Yes	1.17	0.78	1.75	1.30	0.91	1.87
No††	1.00	...	...	1.00	...	...
Don't know	1.96	0.92	4.19	1.63	0.80	3.30

... not applicable
* significantly different from reference category ($p < 0.05$)
†n = 1,001; percent concordant 67.5; percent discordant 32.1; c statistic = 0.677
‡n = 1,093; percent concordant 71.5; percent discordant 28.2; c statistic = 0.717
§ adjusted for age, Inuit region of residence, and proxy reporting
†† reference group
‡‡ reference group is absence of characteristic
Source: 2012 Aboriginal Peoples Survey.

Discussion

According to the 2012 APS, three-quarters of Inuit men and women aged 18 or older in Inuit Nunangat smoked cigarettes; most of them were daily smokers. Despite declining rates of daily smoking among Inuit since 1991,[6] the prevalence of smoking is still much higher than among the Canadian population as a whole.

Findings from this study are consistent with research that has identified associations between smoking and socioeconomic factors in both the general and Aboriginal populations.[9,14-17] In the fully adjusted models, Inuit men and women who were high school graduates were less likely than those who had not obtained a diploma to be smokers. As well, Inuit women with postsecondary education were less likely to smoke than were those who did not have a high school diploma. Smoking was associated with lower household income among Inuit men.

Among Inuit of both sexes, significant relationships were apparent between smoking and household crowding and the presence of a regular smoker in the home. In the present study, 45% of Inuit men and 46% of Inuit women reported living in crowded conditions (more than one person per room); these figures compare with 3% for the total population of Canada.[4] Overcrowding in Inuit Nunangat is associated with issues such as lack of affordable housing and high cost of construction.[1,5] The relationship between crowding and health is complex,[39] and many contextual factors (such as other housing and psycho-social stressors[5]) were beyond the scope of the present study. Future research that disentangles the specific pathways between smoking and crowding in Inuit Nunangat would be fruitful.

Crowded conditions may increase an individual's exposure to smokers. In this study, about one-third of Inuit men and a quarter of Inuit women reported living in homes where a regular smoker was present. Research conducted in Nunavik indicated that in 2004, 84% of Inuit homes had some smoking restrictions,[40] and in 2007/2008, smoking indoors was not allowed by 76% of Nunavut homes.[41] Maintaining a smoke-free home can be difficult. One qualitative study has described the challenges among First Nations women in the northwest region of British Colombia, which included overcrowding; unemployment and more time spent at home; a northern climate not amenable to smoking outside in winter; and difficulty being assertive with guests and family members who smoke.[42] Given the association between smoking and crowding, as well as between smoking and living in homes where a regular smoker is present, further research focusing on Inuit Nunangat and perceived difficulty maintaining a smoke-free home would be informative.

Two associations were specific to Inuit women. Even when the other selected socio-demographic variables were taken into account, Inuit women were more likely to smoke if they lived in food-insecure households. Research has shown that Inuit women are more likely than Inuit men to live in food-insecure circumstances, and food insecurity in Inuit Nunangat has been related to unemployment, crowded conditions, and weaker extended family ties.[25] A qualitative study of Inuit women in Igloolik (Nunavut) identified food insecurity as an outcome of multiple stresses including climate change and a decline in full-time hunting, reduced availability of country foods and weakened sharing networks, as well as short-term and reactive coping mechanisms that actually increase women's vulnerability to food

insecurity in the long run.[43] Food insecurity, therefore, could signal the presence of multiple risk factors, including an association with smoking. Research is warranted to identify the mechanisms at work in this relationship.

The second association with smoking specific to Inuit women was personally having attended a residential school. The factors underlying this association are complex and were not tested in the present study. However, the results point to the importance of considering this aspect of Inuit history when attempting to explain smoking behaviour.

Limitations

This analysis has a number of limitations. Canadian estimates of smoking prevalence based on self-reports are similar to estimates based on urinary cotinine concentrations—a biomarker of tobacco smoke exposure.[44] However, the validity of self-reported cigarette smoking data has not been determined for Inuit.

Associations between smoking and the variables examined are strictly correlational; causality cannot be inferred, and some relationships could be bi-directional. Another limitation is shared method variance; all measures—smoking status and selected covariates—were based on self-reported data collected at a single point in time from the same participants. Also, the covariates are inter-related, and although associations between smoking and these factors are discussed as independent relationships, the complex interplay among them in real life is not captured in the present analyses.

Among Inuit, the number of occasional smokers was much smaller than the number of daily smokers. The 2012 APS only asked follow-up questions (frequency and duration of smoking) if respondents were daily smokers. Therefore, it was not possible to establish similarities between occasional and daily smokers.

The content of the 2012 APS limited the ability to examine some Inuit-specific social determinants of health from ITK's framework (for instance, the environment or early childhood development).

Lastly, proxy reporting could have introduced bias. Preliminary analyses revealed that smoking rates were lower among proxy than non-proxy respondents, suggesting that the prevalence rates reported in this study may be underestimated.

Conclusion

Findings from this analysis empirically document the relationship between smoking and a selection of socio-demographic characteristics relevant to Inuit in Inuit Nunangat. By identifying who is at risk for smoking and by highlighting co-occurring factors, these findings can help inform culturally appropriate prevention and cessation programs and guide efforts at raising awareness of the complex interplay of factors involved in cigarette use among Inuit men and women in Inuit Nunangat.

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