

# Prevalence of self-reported suicidal thoughts in SLiCA. The survey of living conditions in the Arctic (SLiCA)

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**Objectives:** The Survey of Living Condition in the Arctic (SLiCA) is an international research project on health and living conditions among Arctic indigenous peoples. The main objective of this article is to examine the prevalence of self-reported suicide thoughts among the study population in Alaska, Greenland, Sweden and Norway.

**Study design:** Population-based survey.

**Methods:** Indigenous participants aged 16 years (15 years in Greenland) and older living in traditional settlement regions in Alaska, Sweden and Norway and across the entire Greenland were invited to participate. Data were collected in three periods: in Alaska from January 2002 to February 2003, in Greenland from December 2003 to August 2006, in Sweden from spring 2004 to 2006 and in Norway in 2003 and from June 2006 to June 2008. The principal method in SLiCA was standardised face-to-face interviews using a questionnaire. A questionnaire had among other things, questions about health, education, traditional activities, ethnicity and suicidal thoughts.

**Results:** Information about suicidal thoughts, gender and age were available in 2,099 participants between the ages of 16 and 84 from Alaska, Greenland, Sweden and Norway. Greenland had the highest rates of suicidal thoughts when adjusting for age and gender ( $p=0.003$ ). When stratifying on age and gender, significant differences across countries were only found for females in the two youngest age groups. Differences in suicidal thoughts across countries could partly be explained by educational level.

**Conclusion:** Swedish respondents had less suicidal thoughts than those in any other countries. In the future, analyses of suicidal thoughts should take socioeconomic status into account as well as self-reported health, depression and anxiety.

Keywords: *suicidal thoughts; SLiCA; survey; inuit; Inupiat; Sami; indigenous peoples*

Received: 3 October 2011; Revised: 29 October 2011; Accepted: 30 October 2011; Published: 21 November 2011

In the last century, health problems among indigenous people have changed from mainly infectious diseases towards other health risks, due to urbanisation (1). Communicable diseases as tuberculosis and venereal diseases continue to affect indigenous populations, although incidence rates are decreasing (2, 3). However, cancer, ischemic heart disease, obesity and diabetes have become the modern indigenous health risk and show increasing trends. In addition, alcohol and drug abuse, suicide, accidents and violence are important health problems among indigenous groups. Change in dietary patterns, reduction in physical activity and lastly exposure to new environmental hazards are the most suitable explanation of these new health challenges (2, 4). Also,

the prevalence of suicidal behaviour within different indigenous groups indicates great variation (5, 6). The majority of studies show higher prevalence of suicide attempts among indigenous groups than among their majority peers (1, 7). Although several studies have shown considerable disparities in health status among indigenous populations and the general population of the national states, surveys comparing different indigenous groups are missing. Undoubtedly, there are considerable variations across regions and countries.

The Survey of Living Condition in the Arctic (SLiCA) is an international research project on the health and living conditions among indigenous peoples in the Alaska, Canada, Greenland, Norway, Sweden and Russia (8, 9).

The motivation for launching SLiCA was an ambition of reflecting the ways of life of Arctic indigenous peoples more appropriately with regard to resource utilisation. The SLiCA is the first international cooperative study that compares indigenous peoples of the circumpolar north with regard to health and living conditions. The survey aimed to develop a context-specific concept of living conditions more suitable for indigenous peoples who still rely on the harvest of local resources. Accordingly, it was considered more appropriate to explore health and other aspects of the living conditions of peoples with similar ways of life and environmental circumstances, than to compare northern indigenous peoples and southern majority populations (10, 11).

The main objective of this article is to examine the prevalence of self-reported suicide thoughts among the study population in Alaska, Greenland, Sweden and Norway.

## The Arctic indigenous peoples

### *The Sami*

The Sami is the indigenous people of the Nordic countries. The Sami live in the northern regions of Fennoscandia in what today comprises the northern area of Norway, Sweden, Finland and Russia's Kola Peninsula. No exact overview over the total number of Sami exists, and estimates vary in accordance with criteria used such as genetic heritage, mother tongue and sense of belonging to the Sami. Norway has the greatest proportion of the total Sami population.

### *The Inuit*

The traditional homeland of the Alaskan and Greenlandic Inuit comprises the Western and Northern coasts of Alaska and the coastline of Greenland. A substantial Inuit population is settled at the Arctic coast and Arctic Archipelago in northern Canada and at the coast of the Chukotka Peninsula (1, 12). In the SLiCA survey, the Inuit in Alaska was defined by the Inupiat people living in the North Slope, the Kotzebue region and the Nome region. Inupiat people of Alaska have the most in common with Inuit people elsewhere in the Arctic.

## Material and methods

Indigenous participants living in traditional settlement regions in Alaska, Sweden and Norway and across the entire Greenland were invited to participate. Data were collected in three periods: in Alaska from January 2002 to February 2003, in Greenland from December 2003 to August 2006, in Sweden from spring 2004 to 2006 and in Norway in 2003 and from June 2006 to June 2008. The principal method in SLiCA has been standardised face-to-face interviews using a questionnaire on health and other aspects of living condition, indigenous language

and culture. Cue cards were used to efficiently present respondents with response choices. The duration of each interview was approximately 1.5–2 hours. The SLiCA target population is indigenous individuals aged 16 years (15 years in Greenland) and over residing in a traditional settlement region. Indigenous participants were ascertained by self-reported ethnicity. SLiCA's conceptual design has been described in detail elsewhere (8, 9, 13).

### *Age*

The study sample was restricted to persons of age 16–84 years (15–84 years in Greenland), the age span common for all countries. In further analyses, age is categorised into three groups, 16–34, 35–59 and 60–84 years.

### *Questionnaire*

The questionnaire was developed in 11 workshops from 1998 to 2001 and was field tested in Alaska and Greenland (9). All fieldworkers in SLiCA have been trained in interviewing techniques and procedures. Also, an interview guide was produced to optimise standardisation of the training.

### *Suicidal behaviour*

The questionnaire contained two questions about suicidal behaviour. The question 'Have you ever seriously considered to commit suicide?' was used to measure prevalence of suicide thoughts. Alternative answers were 'yes/no'. In addition, respondents who answered 'yes' were asked if this thought was in the course of the last year.

### *Education*

There are some discrepancies in the questionnaire with regard to primary and secondary education, due to different wording of some categories. This is mainly due to discrepancies between the various national and regional school systems. In Norway and Alaska, the question was 'What is the highest level of schooling or training you have completed?' In Alaska category, one was 'Advanced traditional training'. Apart from this, response choices in Norway and Alaska ranged from primary school through PhD degree. In Greenland, education attainment was measured using three questions: 'What level of schooling do you have'; 'are you at the moment undertaking higher education/vocational training'; and 'have you previously completed higher education/vocational training?' To the last two questions, specifying the degree undertaken or completed was possible. In the first question, response choices ranged from 'less than seven years of schooling' through 'high school'. Other response choices were 'other' and 'still in school'. Those still in school ( $n=40$ , data not shown) were categorised according to the highest level of schooling or education completed. Participants reporting 'other' schooling ( $n=67$ , data not shown) and individuals in Alaska

reporting advanced traditional training ( $n=2$ , data not shown) were classified in the appropriate formal category. By re-coding and generating a joint education variable, education level was divided into three groups, less than High School/Vocational School, High School/Vocational School and University education.

### Ethics

The survey is in accordance with the Helsinki Declaration of 1975 and to International Arctic Social Sciences Association (IASSA) Guiding Principles for the Conduct of Research in the Arctic (1998). All participants gave written informed consent prior to the interview. In Norway, the study was accredited by the Norwegian Social Science Data Service and the National Committee for Research Ethics in the Social Sciences and the Humanities. In Alaska, the study was approved by the University of Alaska Institutional Review Board.

### Statistical analyses

Results are presented as counts and percentages. Differences in sample characteristics across countries were tested by ordinary Chi-square tests. When stratifying for gender and age groups, differences in suicidal thoughts between countries were tested by the Fisher exact test, due to small expected cell counts. The Cochran–Mantel–Haenszel test was used to perform an age- and gender-adjusted test for differences between countries.

Two ordinal logistic regression models were fitted to model effects on the three level variables on suicidal thoughts. Explanatory variables in model 1 were country, age group and gender. In model 2, education was added. The age group 60–84 years was excluded in the regression analyses due to a small number of people in this age group having had suicidal thoughts.

Statistical analyses were performed using the SAS statistical software for Windows version 9.1 (SAS Institute Inc., Cary, NC, USA).

### Results

Table 1 shows country-specific characteristics. Information about suicidal thoughts, gender and age were available in 2,099 indigenous participants between the ages of 16 and 84 from Alaska, Greenland, Sweden and Norway. Furthermore, education level was available for 2,064 participants.

The Sami cohort is older than the samples from Greenland and Alaska.

University education was more common among the Norwegian participants. Greenlandic participants reported the lowest educational level. No discrepancy in level of education was observed between Alaska and Greenland in the oldest age stratum (data not shown).

A total number of 298 participants (14.2%) reported to have thought seriously of committing suicide, out of which 125 (6%) reported having had thoughts during the last year.

Table 2 shows the distribution of suicidal thoughts by countries, age and gender. Suicidal thoughts were rare among the oldest part of the sample and more common among the youngest and middle-aged groups. Females reported suicidal thoughts more often than males. There was a significant difference between countries when adjusting for age and gender ( $p=0.003$ ). Greenland had the highest rates and Sweden the lowest. When stratifying on age and gender, significant differences across countries were only found for females in the two youngest age groups (Table 2).

Ordinal logistic regression showed that, adjusted for age and gender, suicidal thoughts were significantly more common in Greenland than in Alaska and significantly

**Table 1.** Sample characteristics ( $n=2099$ )

	Greenland <i>n</i> (%)	Norway <i>n</i> (%)	Sweden <i>n</i> (%)	Alaska <i>n</i> (%)	<i>P</i> -value*
Age					<0.0001
15–34	332 (34)	71 (21)	48 (24)	224 (39)	
35–59	527 (54)	209 (61)	109 (56)	281 (49)	
60–84	126 (13)	63 (18)	39 (20)	70 (12)	
Gender					0.03
Male	473 (48)	171 (50)	102 (52)	243 (42)	
Female	512 (52)	172 (50)	94 (48)	332 (58)	
Education					<0.0001
Less than high school/vocational school	573 (59)	45 (13)	26 (15)	155 (27)	
High school/vocational school	312 (32)	109 (32)	103 (59)	387 (67)	
University	89 (9)	187 (55)	46 (26)	32 (6)	

\*Chi-square tests.

**Table 2.** Suicidal thoughts by country, gender and age

Suicide thoughts		Greenland <i>n</i> (%)	Norway <i>n</i> (%)	Sweden <i>n</i> (%)	Alaska <i>n</i> (%)	<i>P</i> -value
Total	Yes, last year	83 (8)	6 (2)	3 (2)	33 (6)	0.003*
	Yes, but not last year	87 (9)	32 (9)	7 (4)	47 (8)	
	No	815 (83)	305 (89)	186 (95)	495 (86)	
Male						
Age						
15–34	Yes, last year	15 (10)	1 (3)	0	9 (9)	0.57**
	Yes, but not last year	17 (11)	2 (6)	1 (5)	7 (7)	
	No	124 (79)	29 (91)	21 (95)	81 (84)	
35–59	Yes, last year	11 (4)	0	1 (2)	3 (3)	0.41**
	Yes, but not last year	17 (7)	6 (6)	2 (4)	8 (7)	
	No	225 (89)	92 (94)	54 (95)	99 (90)	
60–84	Yes, last year	1 (2)	0	0	0	0.84**
	Yes, but not last year	3 (5)	3 (7)	0	1 (3)	
	No	60 (94)	38 (93)	23 (100)	35 (97)	
Female						
Age						
15–34	Yes, last year	34 (19)	4 (10)	1 (4)	14 (11)	0.05**
	Yes, but not last year	26 (15)	8 (21)	2 (8)	12 (9)	
	No	116 (66)	27 (69)	23 (88)	101 (80)	
35–59	Yes, last year	22 (8)	1 (1)	0	7 (4)	0.01**
	Yes, but not last year	23 (8)	11 (10)	1 (2)	16 (9)	
	No	229 (84)	99 (89)	51 (98)	148 (87)	
60–84	Yes, last year	0	0	1 (6)	0	0.08**
	Yes, but not last year	1 (2)	2 (9)	1 (6)	3 (9)	
	No	61 (98)	20 (91)	14 (88)	31 (91)	

\*Cochran–Mantel–Haenszel test for differences across countries adjusted for age and gender.

\*\*Fisher exact test.

lower in Sweden (Table 3). There was no significant difference between Norway and Alaska.

When educational level was added to the regression, Greenland and Alaska no longer showed a significant difference in suicidal thoughts.

## Discussion

In this survey of Arctic Indigenous people in Alaska, Greenland, Sweden and Norway, we have observed the prevalence of suicidal thoughts among the Inuit and the Sami. The prevalence of suicidal thoughts was studied in relation to countries, gender, age and educational level. The main results demonstrated that there was a significant difference between countries, where suicidal thoughts were more common in Greenland than in Alaska and significantly lower in Sweden.

Education is often used as a proxy for socioeconomic status and represents an important variable in terms of measuring living condition. In numerous studies, socio-

economic status was shown to be associated with health and other living conditions as, for example, housing condition (14).

In present-day Alaska, Norway, Sweden and Greenland, a high school diploma represents 13 years of schooling (kindergarten–12th grade, or 1st–13th grade) and is a requirement for commencing college/university education. In Alaska, the general education development test is an alternative to a high school degree. In Norway and Sweden, vocational training is usually integrated into high school education, whereas local vocational schools provide such training in Greenland and Alaska. Unlike tertiary education in Greenland, Sweden and Norway, education beyond high school in Alaska is fee paying.

Naturally, the level of education among the Inuit and the Sami is associated with age, as the availability of education has increased throughout the 20th century. In Greenland, after the introduction of Home Rule in

**Table 3.** Ordinal logistic regression. Age group 60–84 excluded due to very small numbers of suicide thoughts

	Model 1 (n = 1801) <sup>a</sup>		Model 2 (n = 1783) <sup>b</sup>	
	OR	95% C.I.	OR	95% C.I.
Country				
Greenland	1.48	(1.10–2.00)	1.27	(0.92–1.76)
Norway	0.87	(0.56–1.36)	1.03	(0.63–1.70)
Sweden	0.34	(0.16–0.73)	0.39	(0.18–0.85)
Alaska	1.0 (ref)		1.0 (ref)	
Gender				
Female	1.71	(1.31–2.24)	1.74	(1.32–2.28)
Male	1.0 (ref)		1.0 (ref)	
Age				
15–34	2.28	(1.76–2.96)	2.18	(1.68–2.84)
35–59	1.0 (ref)		1.0 (ref)	
Education				
Less than high school/vocational school			1.0 (ref)	
High school/vocational school			0.65	(0.48–0.88)
University			0.54	(0.33–0.87)

<sup>a</sup>Explanatory variables in model 1 were country, age group and gender.

<sup>b</sup>Explanatory variables in model 2 were country, age group, gender and education.

1979, 7 years of compulsory schooling was replaced by 9 years of obligatory primary and middle school. From 1977, high school education was made available (15). In 1983, the Inuit Institute College was established and later assigned university status in 1989: Ilisimatusarfik, University of Greenland, Alaska, USA (16).

Until the late 1970s, school facilities on Alaska's North Slope were available only up to ninth grade, and high school students had to attend boarding schools far from home. A law suit was brought against the state of Alaska in 1976 committing it to establish high schools in rural villages, with the further aim of including Iñupiaq language and culture in the curriculum. New school programmes were consequently introduced in 95 communities throughout rural Alaska (17). A handful of colleges and the University of Alaska system provide tertiary education today. The Bureau of Indian Education serves American Indian and Alaska Native post-secondary students through higher education scholarships (18). As in Greenland, primary and middle school constitutes today 10 years of compulsory schooling both in Norway and Sweden. The University of Tromsø was opened in 1972. The Sami University College was established in Kautokeino in 1989 (19). Students from different part of Sápmi can study at The Sami University College, where the education is primarily given in Sami language. Today, the level of education is generally high in Norway and Sweden. In Norway, it is higher for women than for men (20). Furthermore, the

Sami settlement of Karasjok has one of the nation's highest levels of education for women aged 25–40 years (21). Education is known to protect against disease. A high education level is closely related to better socio-economic status. However, education level can also be a proxy of urbanisation. Indigenous societies are transformed from rural characteristics in terms of economy, culture and lifestyle, to one which can be characterised as urban. Urbanisation is a global trend and there is a marked divide between regions. Places where educational opportunities are available are growing, whereas the smaller places experience a decline. This lead to various sociocultural changes. In Norway and Sweden, this urbanisation process started after the Second World War and has influenced societies and people for several decades. Among other things, this can be one of the explanations to the education level in Scandinavia. In other regions in the Arctic, the urbanisation process has started some decade later, but the sociocultural changes are today quite similar in the whole region. Not all the changes have been for the best for the indigenous people. In the course of the changes, various new social, political and environmental challenges have arrived (1, 22). As a consequence of all these social changes, different health risks have become a major problem for the indigenous peoples (23–25). It is assumed that the continuous sociocultural transition has an influence on indigenous people's well-being. In many indigenous societies, suicide rates are alarmingly high, particularly in Greenland and

Alaska (23, 26–28). In the SLiCA survey, the percentage of suicidal thoughts in Greenland, Alaska, Norway and Sweden were 17%, 14%, 11% and 6%, respectively. The prevalence of suicide thoughts is highest among the Greenland and Alaskan participants and very low among Swedish participants. In addition, suicidal thoughts were most frequent in the youngest age group in all countries. When education level was added to the model, the difference between Greenland and Alaska was no longer significant. The variation in prevalence of suicidal thoughts between the different indigenous groups in SLiCA cannot be easily explained. However, transition from traditional to modern lifestyle among the indigenous populations has increased the prevalence of several chronic diseases as cancer and cardiovascular disease (24). Poor health in general is known to influence mental health. Grossmann and colleagues found that self-perception of poor general health was associated with history of suicide attempts among Navajo adolescents (25). Associations have been found between somatic symptoms and depression, anxiety and suicide attempts in other adolescent populations (29, 30). One major challenge in our study is the historical and country-specific differences between the ethnic groups, the Sami and the Inuit. Indigenous populations participating in SLiCA are diverse. Setup and access to health care systems vary greatly according to geography and country. Development of community-level health systems and public-health planning that reflect geographic location and indigenous ethnic groups varies between countries. In additions, suicidal thoughts and attempts are context dependent. In a community with a high rate of suicidal attempts, this can affect especially the young people, as an accepted pattern of behaviour.

In our analyses, we have not adjusted for these factors, but several associations shall be investigated in future studies. And, lastly it is important to emphasise that although suicidal thoughts and suicidal attempts are different phenomena, suicidal thoughts are associated with suicidal attempts and therefore important clinical indicators.

When stratified in age groups and gender, the differences on suicidal thoughts between countries were significant only for the female participants. Moreover, females reported suicidal thoughts more often than males in all countries, except for Sweden. Our results are in accordance with an earlier study on indigenous Sami adolescents in Norway where females reported a higher degree of suicidal thoughts (19%) (6).

Among Arctic Indigenous people, little is known about the causes of mental health problems in general and the impact of rapid sociocultural changes in particular. The SLiCA survey's contribution to this research is important to expand the understanding of the topic. Especially, epidemiological knowledge about suicidal behaviour

among indigenous populations is important for the implementation of appropriate prevention strategies in the health care system in local communities.

In the future analyses of suicidal thoughts, education and other measures of socioeconomic status should be taken into account as well as self-reported health, depression and anxiety.

## Acknowledgements

We would like to thank all project workers participating in the data collection and processing in Greenland, Alaska, Sweden and Norway. Above all, we thank the Kalaallit of Greenland, the Iñupiat and Yupik of Alaska and the Sami of Sweden and Norway who participated in the study. Especially, thanks to the SLiCA international working team; Jack Kruse, Birger Poppel and Hugh Beach. Also, thanks to Anne Silviken for valuable comments on the manuscript.

## Conflict of interest and funding

Funding was provided from the following bodies: Nordic Council of Ministers, the Greenlandic Home Rule, the Commission for Scientific Research in Greenland, the Barents Secretariat, North Atlantic Research Programme, the Danish Research Council of Social Science, the Joint Committee on Research Council for Nordic Countries and the National Science Foundation, USA.

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