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Health Aspects of Colonization and the Post-Colonial Period in Green- land 1721 to 2014

ABSTRACT Colonization in Greenland lasted from 1721 to 1953 but even after the introduction of self-government in 2009, aspects of economic and cultural colonization persist. Several epidemics that decimated the population have been recorded from the colonial period. In the post-colonial period urbanization, immigration of Danish workers and alcohol consumption increased significantly while suicides became an important cause of death.

We have outlined two parallel sequences of events, namely the general history of Greenland with emphasis on certain effects of colonization on everyday life and the epidemiological transition with emphasis on mental health. In particular, results from a health survey in 2014 among the Inuit in Greenland showed statistically significant associations between suicidal thoughts in adulthood and sexual abuse as a child as well as between sexual abuse as a child and alcohol problems in the childhood home. Among women also current socioeconomic conditions were associated with sexual abuse as a child.

Colonization in Greenland was relatively benign and our results illustrate that it is not only extensive colonial stress such as genocide and loss of language and culture that has negative effects on mental health but also the more subtle stress factors that the Inuit in Greenland were exposed to.

KEYWORDS Inuit, Greenland, colonization, mental health, alcohol, suicides

Introduction

All colonizations are different but there is a common core. Many but not all indigenous peoples share a history of displacement, slave labour, loss of language and culture, and ending up as a marginalized minority. The Inuit of Greenland have been spared most of this as colonization was generally benign. No Greenlanders were enrolled as slave labourers and the land was not taken over by settlers. The Inuit language has survived. In more recent times, contrary to the Inuit in Canada the Greenland Inuit were not transported south for treatment of tuberculosis nor were they enrolled in the notorious boarding school system. But the Danish/Norwegian colonizers did impose a sense of their superiority, smallpox epidemics did reduce the population significantly and indigenous control was curbed. However, the post-colonial period is characterized by massive mental health problems including very high rates of youth suicides. The high rates of depression, alcoholism, suicide, and violence experienced in many indigenous communities have been linked to cultural discontinuity and oppression among aboriginal peoples in general (Kirmayer *et al.* 2000). Especially in the North American context these issues have been conceptualized as historical trauma and subsequently linked to intergenerational trauma in the younger generations (Kirmayer *et al.* 2014). In northern Scandinavia, young Sami experienced higher occurrence of suicidal ideation than non-Sami (Omma *et al.* 2013). Especially reindeer herders exhibited suicidal behaviour and several studies have argued that the difficulties of maintaining a traditional livelihood are a key to understanding suicidal behaviour in Sápmi (Silviken 2011; Kaiser 2011; Stoor *et al.* 2015). In Greenland, suicides and other mental health problems have been attributed to an intense post-colonial development but research has not been able to point at specific components of the development process as causal (Lynge 1997; Bjerregaard & Lynge 2006).

The purpose of the present paper is to give an overview of the health related effects of the Danish/Norwegian colonization of Greenland and of the health and societal changes during the post-colonial period. We shall in

particular analyse suicides and suicidal thoughts among adults as indicators of poor mental health. Our hypothesis was based on the observation that (youth) suicide rates soared in the generations that grew up in the post-colonial era and that the temporal pattern of suicides differed among the capital, towns, villages and the east coast (Bjerregaard & Larsen 2015) where also modernization happened at various pace. Based on previous research by ourselves and others (see, for example, Bjerregaard & Lynge 2006; Christensen & Baviskar 2015; Lynge 1997; Pedersen & Bjerregaard 2012; Thorslund 1992) we subsequently hypothesized that recent suicidal thoughts were associated with birth cohort, socioeconomic position, current residence and not least childhood conditions including place of residence, alcohol problems in the family and sexual abuse during childhood. The fact that male suicide rates are significantly higher than female rates while the prevalence of suicidal thoughts is somewhat higher in females (Bjerregaard & Larsen 2015) argues for the construction of separate statistical models for the two genders.

Data and Methods

During the 200 years following initial colonization, information on health was collected by the colonial administrators in their reports and from the diaries of explorers. This material was collected by Bertelsen in his monumental work in four volumes *Grønlandsk medicinsk Statistik og Nosografi* ['Greenland medical statistics and nosography'] (Bertelsen 1935; Bertelsen 1937; Bertelsen 1940; Bertelsen 1943) which is the main source of the description of the colonial period below.

Prior to the 1970s information on health is scarce and often anecdotic. From 1950 the local District Medical Officers have reported health conditions, diseases and deaths to the Chief Medical Officer who publishes an annual report. Statistics Greenland, a number of censuses and a variety of other sources have information about demography and import of alcohol. In 1972 Greenland was integrated in the Danish population registry and all persons were attributed a unique civil registration number that follows individuals throughout life and facilitates longitudinal epidemiological research. The Greenland Registry of Causes of Death has information on all deaths in Greenland since 1968 coded according to the International Classification of Diseases. The Death Registry currently covers the period 1968–2013 and has information about all 19,309 deaths in Greenland during that period of which 94 per cent have a diagnosis according to ICD-8 or ICD-10. Since 1993, regular population health surveys have been carried out. The most recent survey is from 2014 and contrary to the registries mentioned above the surveys have information on persons who have not been in contact with the health services. The analyses in the present paper are with few

exceptions based on the Registry of Causes of Death and the most recent Population Health Survey in 2014.

Population Health Survey 2014

As for previous health surveys, data for the 2014 Population Health Survey were collected by interviews and self-administered questionnaires supplemented by a few clinical measurements and blood sampling in a subsample (Bjerregaard 2011). Interviews were conducted in the language of choice of the participant, most often in Greenlandic, by native Greenlandic speaking interviewers who had been trained in the study procedures. The self-administered questionnaires were available in Greenlandic and Danish.

All 4,322 surviving participants in previous surveys who were still residents of Greenland made up the initial sample. For logistic reasons towns with less than 60 and villages with less than 25 persons in the sample were excluded from the survey reducing the initial sample to 3,016 adult Greenlanders and Danes currently living in 11 towns and 8 villages in West and East Greenland. A supplementary sample of 775 persons aged 18–25 years was drawn from the population register in order to maintain the study as representative of the whole adult population in Greenland. During the interview phase the sample was further reduced by persons who had died, moved out of the communities under study or which the interviewers were unable to contact despite a broad search including contacts with the municipal authorities, the health care services, family members and neighbours (n=432). The final sample consisted of 3,359 persons and with a response rate of 63 per cent, the study base was 2,102. Inuit made up 2,064 of the participants (98 %) and 1,841 (89 %) of these answered the self-administered questionnaire.

Information on education classified as None/School only; Short; and Medium/Long was obtained by interview. Household wealth was measured using an index of ownership of seven household items including video/DVD player, computer, landline telephone, refrigerator, microwave oven, washing machine and dishwasher. Household wealth was calculated as the sum of these items and subsequently divided into quartiles. Information on suicidal thoughts, exposure to alcohol problems and sexual abuse during childhood was obtained by a self-administered questionnaire by the following questions used since 1993: "Have you ever seriously considered suicide? If yes, was this within the last year?;" "Were there alcohol related problems in your home as a child? Answers can be yes often/yes sometimes/no never;" "Have you ever been sexually abused or has somebody attempted to sexually abuse you? As a child (less than 13 years old); as a young person (13–17 years old); as an adult (18 years old or older)." All three questions were to be answered yes/no.

Data from the Greenland Registry of Causes of Death and the Population Health Surveys were analysed using the statistical analysis programme SPSS version 22. Statistical procedures included general linear models and binary logistic regression models with backwards selection. Backwards selection was chosen because the progression proceeds from a full model to the simplest possible model in accordance with the data but this can be said to be a matter of personal choice. We have chosen to make separate logistic regression models for men and women instead of introducing an interactive term because the former approach is more intuitively informative to readers who are not professional statisticians and because we suspect that the social variables may have different impact on men and women that are not brought to light by interaction analysis. Direct standardization for age was performed by Excel spreadsheets for Figs. 2 and 5.

Background

General History of Greenland

Greenland has during the last 4,000 years been populated in a number of migration waves from the west and the east. Several Paleoeskimo cultures (Saqqaaq, Independence I and II, Dorset) have been identified. Originating in Siberia and Alaska, these immigrants crossed the ice on the narrow strait between Canada and Greenland. The last of these cultures, the Dorset, had all but disappeared when in 985 the Norse Vikings came by ship from Iceland and Norway and set up a community that for 500 years thrived in the southwest part of the country. Around 1200 the bearers of the Thule culture, which are the immediate ancestors of present day Inuit in Greenland, arrived from Canada and soon spread over the entire coastline (Gulløv *et al.* 2004).

The start of colonization in Greenland defined as the continued presence of an economically and military superior power may be set at 1721 when the Danish-Norwegian missionary Hans Egede took land not far from present day Nuuk. East and North Greenland were colonized later, East Greenland in the late nineteenth century and North Greenland/Avanersuaq in the early twentieth century. The colonization period formally ended in 1953 when Greenland became an integrated part of the Kingdom of Denmark but even after the introduction of Home Rule in 1979 and Self Government in 2009 aspects of economic and cultural colonization persist.

It has recently become possible to estimate the relative genetic distribution on Inuit and European ancestry (Moltke *et al.* 2015). Despite the relatively minor presence of Europeans during colonial times around 80 per cent of more than 4,600 survey participants ethnically classified as Inuit

had some European ancestry; on average 25 per cent of the genome. The relative distribution varied across the country and was as expected least in villages and remote parts of Greenland. No trace was found of Norse Viking or Dorset admixture.

Colonization and the G-50

During the eighteenth century, Christianity replaced the religion of the Inuit and by a variety of enticements the Inuit hunters were convinced to trade the blubber and fur of marine mammals for consumer goods such as tobacco, coffee, sugar, cloth etc. Alcohol, however, was not for sale to the common Greenlanders throughout the colonial period. Education and literacy followed in the footsteps of religion and already in 1861 the first newspaper in Greenlandic language—*Atuagagdluutit*—was published.

The traditional livelihood of the Inuit was the hunting of marine mammals, seals in particular, which necessitated a decentralized settlement pattern. Due to a warming of the ocean temperatures in the beginning of the twentieth century, vast shoals of cod found their way to the coastal waters of Greenland and a transition towards commercial fishing, cash economy and increased urbanization started.

Until the Second World War Greenland was a closed country and nobody could enter without permission from the Royal Greenland Trade Department. The war severed the connection with Denmark and Greenland opened up towards the USA. After the war, time was ripe for change and a reform commission was established by the Danish government, the G-50 Commission. G-50 suggested several changes among which were the further development of a commercial fishing industry and support of the already ongoing centralization of the population (Ministry of Social Affairs 1950). In 1953 the former colony became an integral part of Denmark. Many negative aspects of colonization were absent in Greenland. There was never forced enrolment of children in boarding schools abroad although during the postcolonial period parents were enticed to let their children attend school in Denmark for one year. The post-war anti-tuberculosis campaigns also did not send patients abroad for treatment but carried out treatment in Greenland.

The Post-Colonial Period

After 1953 a massive infrastructural development was initiated with the Danes in the driver's seat. In 1979 Home Rule was granted with an increasing number of public sectors being transferred to Greenland authority. En route to nationhood, self-governing status was obtained in 2009 but the economy of Greenland is still subsidized by Denmark; in 2013 the BNP was

13.6 billion DKK and direct subsidies from Denmark amounted to 3.6 billion DKK (26 %).

During the post-colonial years profound changes took place in Greenland. The population increased from 24,000 to 56,000 in 2014 and the movement from villages to towns continued. While in 1950, 50 per cent of the population lived in villages this proportion had decreased to 15 per cent in 2014. Hospitals were built in all towns. Alcohol consumption increased and by 1960 surpassed the average consumption per capita in Denmark. Greenland became connected internally and to the outside world by commercial airlines and telephone, and in 1992 the introduction of real time TV further integrated Greenland in the world community. Widespread availability of the Internet has improved participation in the global community although data traffic rates are still prohibitively high.

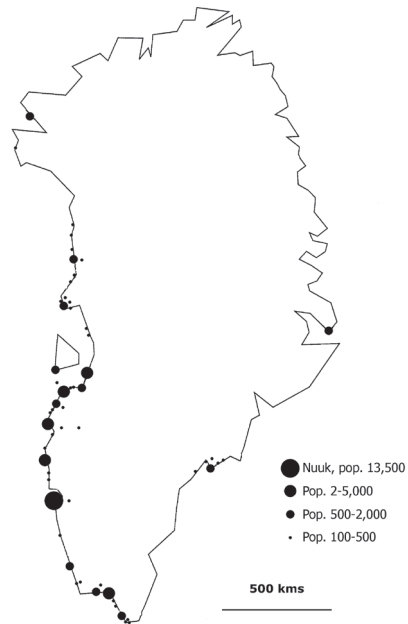
There were never many colonists and the Danes rarely settled permanently in Greenland. In 1901 Danes made up 2.3 per cent of the population, a proportion that had increased to 4.4 per cent by 1950 (Statistics Denmark). After G-50 had catapulted Greenland into an intense modernization, the proportion of migrant workers from Denmark increased dramatically reaching a peak of 19 per cent in 1975. It is now down to 11 per cent.

Aspects of colonial inequity persist. One example of this is the widespread use of Danish as the language of administration and education which puts many monolingual Greenlanders at a disadvantage; another example is the discrepancy in income between persons born in Greenland and persons born outside Greenland. In 2013, according to official statistics, the average income of 20–64 year old persons born in Greenland was 151,000 DKK compared with 277,000 DKK of those born outside Greenland, a ratio of 0.55. Recently, the now former prime minister established a reconciliation commission, which has received some attention but not overwhelming popular support.

In 2015, the population of Greenland was 55,984 of which 89 per cent were born in Greenland and 11 per cent were born outside Greenland, mostly in Denmark. Place of birth is a proxy for ethnicity used by Statistics Greenland and other agencies; for adults living in Greenland, this is a rough but useful estimate of ethnicity as Greenlanders (Inuit) or Danes. Among 2,069 participants in a population health survey in 2014, 95 per cent of those born in Greenland classified themselves as Greenlanders. Greenlandic, an Inuit language, is the vernacular spoken by virtually everybody while Danish is the major second language, spoken by a substantial proportion although far from all.

Fig. 1. Map of Greenland with towns and villages indicated by dots according to population size. Villages with less than 100 inhabitants are not shown.

The population is scattered in 17 small towns and approximately 60 villages which are all situated on a narrow coastal strip. A town is defined historically as the largest community in each of 17 districts. The capital, Nuuk, has 17,000 inhabitants, the second largest town 5,600 and the villages between 500 and less than 50 inhabitants. In the towns are located district school(s), health centre or hospital, church, district administration and main shops. These institutions are absent or present to a much smaller extent in villages. There



are no roads connecting the communities. The majority (92 %) lives on the West Coast, around 3,500 people live on the South East Coast, and about 750 people live in Avanersuaq in the extreme northwest corner of the island (Fig. 1). The communities in the east and extreme north are poorer and less developed than the rest of the country. Countrywide there are marked socioeconomic and infrastructural differences between towns and villages.

Results

Early Health Effects of Colonization. Eighteenth and Nineteenth Century

Relatively little is known about the health of the Inuit at the time of the first contact with Europeans in the seventeenth century. Whalers and explorers left no information. The first description of the health of the Inuit was given by missionary Hans Egede ([1741] 1984) according to whom epidemics (such as plague and smallpox) were unknown until 1734

when one of the [Greenlanders] who had been infected by smallpox in Copenhagen passed the infection on so that more than two thousand people in the vicinity of "the Colony" died. (Egede [1741] 1984: 67)

Information on health is sparse during the colonization period and based on laymen's observations but a number of epidemics have been recorded. During the eighteenth and nineteenth centuries repeated epidemics of in-

fluenza, respiratory infections, smallpox and typhoid fever decimated the population as had been the case all over the Americas during the early years of contact. The impact of these epidemics is for the most not described in detail. However, in one community of 400 inhabitants, 357 (90 %) died in the smallpox epidemic of 1800. In some communities the whole population died, in others only a few children were spared (Bertelsen 1943).

Starvation and even hunger deaths were not uncommon in the eighteenth century but probably also later. In 1884 in East Greenland cases of survival due to cannibalism were reported. Even as late as in 1980 a local informant pointed out an abandoned village in North Greenland to one of the authors where allegedly a family had starved to death while the informant was a young man in the middle of the twentieth century. At the “colonies” starvation was to some extent kept at bay by the distribution of hunger relief to those most in need, but this was far from adequate and almost every winter witnessed periods of severe starvation when the Greenlanders were forced to eat their skin clothes, the soles of their boots and the skin covering of their kayaks (Bertelsen 1937).

Health in the Twentieth and Twenty-First Century

Based on information from Bertelsen (1935), the annual reports of the Chief Medical Officer and the Greenland Registry of Causes of Death, Fig. 2 gives an overview of causes of death in the Inuit population of Greenland since

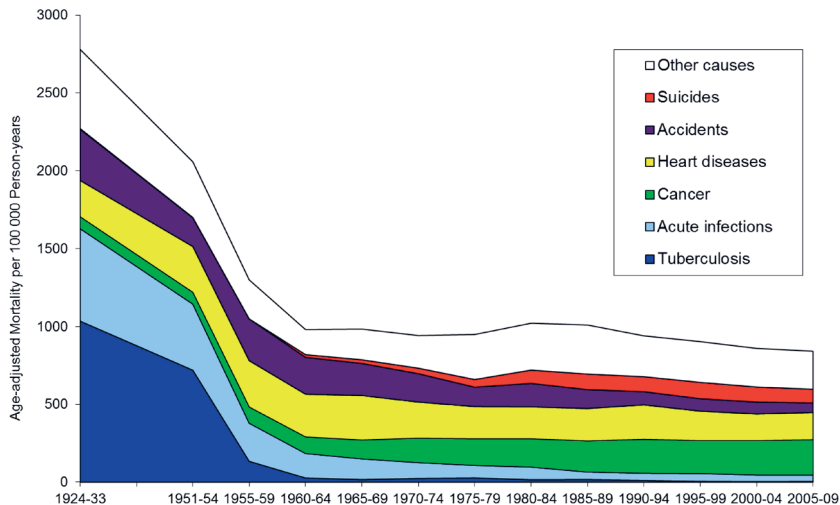


Fig. 2. Age-adjusted mortality from major causes of death in the Inuit population of Greenland 1924–2009. Data sources: Bertelsen (1935); Chief Medical Officer (1951–1967); unpublished analyses of the Registry of Causes of Death at the National Institute of Public Health.

1924. Mortality from tuberculosis and acute infectious diseases declined significantly until the 1960s and are now negligible as causes of death. Since 1960, a decrease in mortality from infectious diseases, heart diseases and accidents has been balanced by an increase in mortality from cancer and suicides.

The decrease in mortality from tuberculosis and acute infectious diseases can be attributed to a combination of improved living conditions, including housing, and improved health care in the post-colonial period. The increase in mortality from cancer has to a great extent been due to lung cancer and other tobacco related cancers (own analyses of the Greenland registry of causes of death). Although this drug was introduced during colonial times by colonial traders, it was more than willingly accepted. The combination of dietary transition and reduced physical activity has resulted in vastly increasing prevalence of obesity and diabetes.

Mental Health, Alcohol and Suicides

There is general consensus among health care professionals and Greenland politicians that mental health is a major case for adverse effects of (post-) colonial development on health. In this respect, alcohol misuse and suicides stand out as rather well studied themes. During colonial times it was illegal to sell or give alcohol to the Inuit except in certain situations as a reward. It was accordingly highly valued and it was reported by the colonial authorities that intoxication was the purpose of drinking. In 1955 general sale of al-

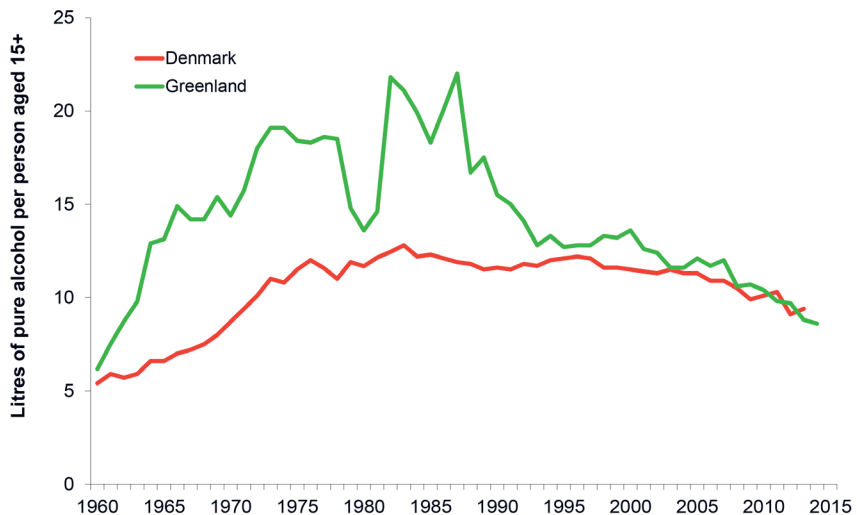


Fig. 3. Import of alcohol to Greenland and sale of alcohol in Denmark 1960–2014, calculated as litres of 100 % alcohol per person aged 15+. Data sources: Statistics Greenland; Statistics Denmark.

cohol was permitted and consumption increased (Fig. 3). Strictly speaking, information is only available for import of alcohol but in the absence of any significant cross border purchase or home production this is for practical reasons equivalent to consumption (Bjerregaard & Becker 2013). Apart from a brief interlude in 1979–1982 with restrictions on the sale of alcohol, consumption increased until 1987. After this consumption plummeted and since 1993 there has been a slight but steady downward trend. However, despite this pattern and the fact that for 20 years the average consumption has been at the same level as in Denmark alcohol misuse is still among the most serious public health problems, if not the most serious problem, in Greenland.

First, an average consumption of about 10 litres of pure alcohol per person aged 15 and above is quite high compared with many countries in the world, for instance 50–70 per cent higher than in Norway and Sweden. Second, the typical consumption pattern in Greenland is characterized by weekly or monthly episodes of high consumption, binge drinking, which has multiple health and social risks. Third, the effects of the high consumption during 1965 to 1990 are still substantial. Fig. 4 shows the prevalence of alcohol problems in the childhood home reported by participants in the health survey of 2014 by year of birth. Already among those born in 1950, the reported prevalence of often having witnessed alcohol problems was 12 per cent, increasing to a peak of 29 per cent among those born 1975–1979. Among those born during 1965–1995 and probably reporting their childhood conditions during 1970–2000, more than 60 per cent reported having witnessed some degree of alcohol related problems in their childhood home. This temporal trend corresponds well with the alcohol import statistics. A similar temporal pattern exists for another indicator of dysfunctional families, namely sexual abuse. Child sexual abuse does not generally happen between close relatives. More often it is the case that parents are unable to control what is happening in a home steeped in alcohol (Christensen & Baviskar 2015; Pedersen & Bjerregaard 2012). Birth cohorts from 1970 to 1989 reported sexual abuse much more often than previous birth cohorts and more often than the few survey participants born in 1990 and later. Two demographic variables (urbanization and immigration) showed parallel development with alcohol problems (Fig. 4).

Suicides

In colonial times, suicide rates were low, estimated by Bertelsen (1935) at 2.3 per 100,000 person-years in the beginning of the twentieth century. A significant increase took place from 1960 to 1980 and since 1980 the crude suicide rate has been around 100 per 100,000 person-years (Bjerregaard &

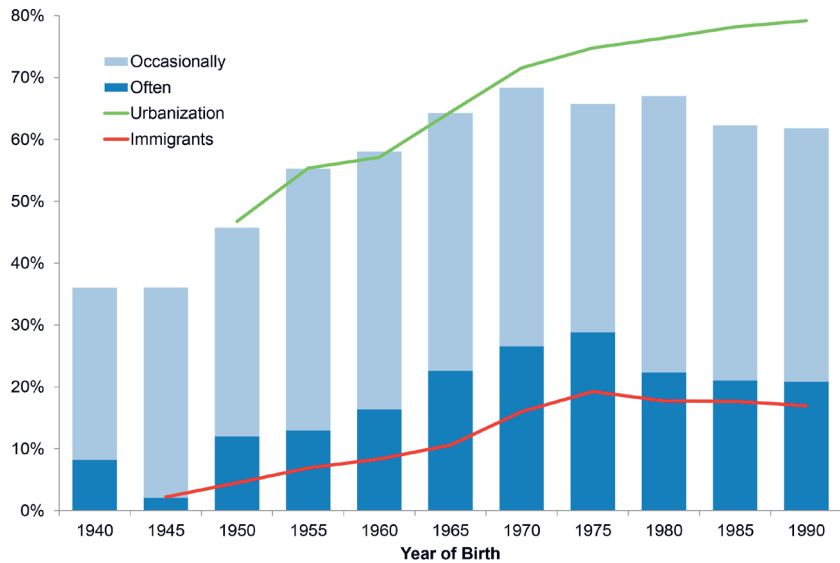


Fig. 4. Reported prevalence of alcohol problems in the childhood home of participants in the 2014 health survey by year of birth. Inuit in Greenland; N=1739. Overlay of official statistics of urbanization (per cent living in towns) and percentage of (Danish) immigrant (workers). Data sources: Statistics Greenland and unpublished analyses of the Health Survey in 2014 (see Dahl-Petersen *et al.*, 2016).

Larsen 2015). Suicides are considerably more common among men than among women, and there is a distinct peak in the age group 20–24 for men and 15–19 for women.

In a colonial discourse it is particularly relevant to note that the temporal trend of suicides differs among regions (Fig. 5) (Bjerregaard & Larsen 2015). In the towns of West Greenland the temporal pattern was similar to that of the whole country, namely an increase until the late 1980s followed by stagnation of rates. In contrast, the capital had an early rise in rates in 1980–1984 followed by a decrease, and rates have been lower than in the other towns in West Greenland since 1985–1989. From the start, the suicide rates in the villages in West Greenland were relatively low but a steady increase has brought them at the same level as those of the towns. Finally, the suicide rates in East and North Greenland have remained the highest of all since 1985, recently more than twice as high as rates in West Greenland although there was a decline in the most recent period, possibly artificial due to small absolute numbers. Since 1985 the rates have differed little among the three regions in West Greenland but since 2000 the rate for the capital was below those of the rest of West Greenland ($p=0.004$) while the rate in East and North Greenland was higher ($p<0.001$). The different tempo-

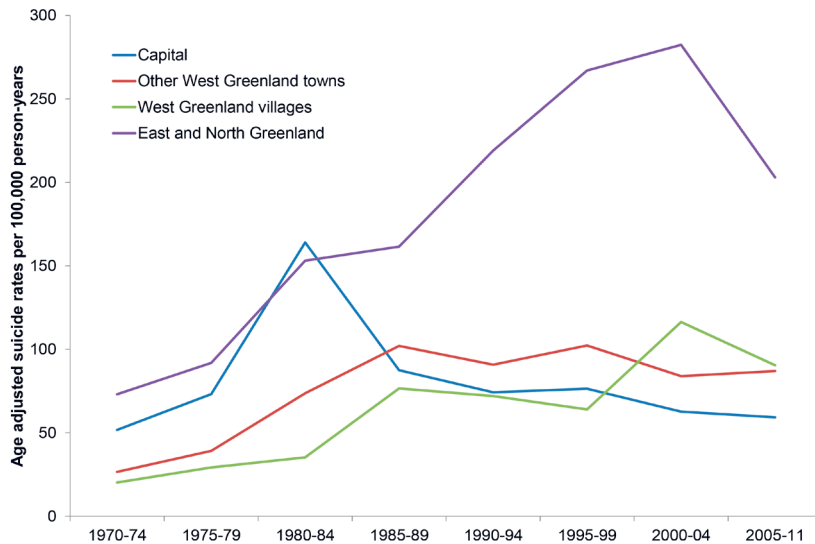


Fig. 5. Temporal trend of suicides in four regions of Greenland. Inuit in Greenland. Rates per 100,000 person-years standardized to World Standard Population 2000–2025. N=1669. Source: Bjerregaard & Larsen (2015).

ral patterns suggest that the timing and degree of post-colonial social and economic development influence the suicide pattern. Social and economic development started first in the capital and socioeconomic conditions have generally become better there than in the rest of the country. In remote East and North Greenland, the development started later, and the improvements in socioeconomic conditions have not yet reached those achieved in the rest of the country.

Suicidal Thoughts

While the analysis of completed suicides is only possible at superficial and ecological levels such as rates by age and sex, calendar year, year of birth, and place of residence, questions about suicidal ideation were included in the recurrent health surveys and may be analysed according to for instance social position and childhood conditions. Suicidal thoughts and attempts are much more prevalent than completed suicides and should not only be thought of as risk factors for suicide but as a general measure of poor mental health. The variable used for the present analyses was suicidal thoughts within the last year. Of 1,841 Inuit participants in the 2014 survey who filled out the self-administered questionnaire, 1,749 (95 %) answered this question.

Table 1. Associations of childhood conditions, socioeconomic position and current residence with recent suicidal thoughts. Adjusted for birth cohort. Inuit of Greenland 2014. N=1706.

Childhood	
Sexual abuse	No Yes
Alcohol problems in home	None Sometimes Often
Residence 10 years old	Nuuk Other towns in West Greenland Villages in West Greenland East Greenland
Current socioeconomic position	
Education	None Short Long
Household assets	1st quartile 2nd quartile 3rd quartile 4th quartile
Current residence	Nuuk Other towns in West Greenland Villages in West Greenland East Greenland

While suicide rates were much higher for men at all ages, the prevalence of suicidal thoughts was similar for men and women. Among participants in the age group 18–29, 28 per cent had ever had serious suicidal thoughts while 25 per cent had attempted suicide (Bjerregaard & Larsen 2015).

We hypothesized that recent suicidal thoughts were associated with birth cohort, gender, childhood conditions, socioeconomic position and current place of residence. This hypothesis was tested in the most recent dataset from 2014. The prevalence of recent suicidal thoughts increased significantly with birth cohort but was not significantly different in men and women. Table 1 shows separately for men and women univariate associations of the other variables adjusted for birth cohort in a General Linear Model. All associations were statistically significant in women but only a

Men			Women		
Estimate %	95 % Conf.int.	p	Estimate %	95 % Conf.int.	p
9.4	6.7;12.2	<0.001	6.0	3.7;8.2	<0.001
24.3	17.5;31.0		17.9	14.6;21.2	
7.7	4.3;11.0	0.02	7.0	4.2;9.7	0.045
10.3	7.1;13.6		10.2	7.6;12.9	
18.2	13.2;23.3		12.1	8.6;15.7	
11.8	5.7;17.9	0.75	7.0	2.1;11.9	0.009
11.7	8.7;14.7		8.1	5.7;10.5	
9.2	4.7;13.7		9.6	6.5;12.8	
10.1	4.7;15.4		16.9	12.1;21.7	
11.9	8.9;14.9	0.34	11.2	8.9;13.5	0.004
10.3	6.7;13.9		8.9	6.1;11.8	
7.4	10.7;13.1		3.4	0;7.6	
13.0	8.5;17.6	0.03	12.9	9.2;13.7	0.002
16.0	11.2;20.8		13.2	9.2;17.1	
10.4	5.9;15.0		10.0	6.5;13.4	
8.2	5.0;11.5		6.1	3.5;8.6	
12.4	8.5;16.3	0.46	5.4	2.5;8.3	0.001
11.3	8.2;14.4		9.9	7.4;12.3	
6.6	0;13.8		10.8	6.4;15.3	
9.1	3.5;14.6		17.1	11.8;22.4	

few in men. The main findings were that being exposed to sexual abuse and alcohol problems during childhood as well as poverty increased the prevalence considerably. In women also lack of education and childhood and current residence in East Greenland were associated with high prevalence of suicidal thoughts.

A statistical model was built with these variables and Table 2 shows the results of a logistic regression analysis with backwards removal of variables. For both men and women Odds Ratios for sexual abuse during childhood were high (3.0 and 4.1, respectively) while inverse associations with a measure of socioeconomic position (household wealth) were less powerful. For men, alcohol problems in childhood showed an additional high OR of 3.8. The univariate associations with education and residence did not enter the models.

Table 2. Model for recent suicidal thoughts among Inuit in Greenland. Logistic regression adjusted for birth cohort. N=1706. Nagelkerke R-square

	Men ($r^2=0.18$)			Women ($r^2=0.17$)		
	OR	95 % Conf.int.	p	OR	95 % Conf.int.	p
Sexual abuse	2.98	1.37;6.46	0.006	4.11	2.45;6.90	<0.001
Alcohol problems in home (often)	3.82	1.57;9.30	0.003	n.s.	-	-
Assets	0.82	0.68;1.00	0.05	0.84	0.72;0.99	0.04

Note: n.s. = not in model.

Table 3. Model for sexual abuse in childhood among Inuit in Greenland. Logistic regression adjusted for birth cohort. N=1494. Nagelkerke R-square.

	Men ($r^2=0.18$)			Women ($r^2=0.17$)		
	OR	95 % Conf.int.	p	OR	95 % Conf.int.	p
Alcohol problems in home (often)	4.79	2.35;9.76	<0.001	3.47	2.29;5.26	<0.001
Education (medium-high)	n.s.	-	-	1.79	1.08;2.96	0.02
Household assets	n.s.	-	-	0.85	0.77;0.95	0.003
Current residence (towns outside Nuuk)				1.77	1.18;2.66	0.006
Current residence (villages in West Greenland)	n.s.	-	-	2.15	1.14;4.06	0.02

Note: n.s. = not in model.

With child sexual abuse as the major risk factor for recent suicidal thoughts the next logical step was to search for risk factors for this. The result of a logistic regression model with child sexual abuse as the outcome variable (Table 3) showed that for men the only significant risk factor was alcohol problems in the childhood home (OR for sexual abuse among participants reporting often having had alcohol problems=4.8; 95 % CI 2.4;9.8). For women, alcohol problems in the childhood home was the most significant risk factor (OR=3.5; 95 % CI 2.3;5.3) while also medium/high education, poverty and current residence outside the capital were statistically significant. Women growing up in East Greenland had an OR=2.23 ($p=0.10$) for sexual abuse in childhood; the lack of statistical significance may be due to a relatively small absolute number.

Discussion

The Inuit in Greenland is an example of a people subject to a benign colonization followed by a peaceful decolonization, that is by now far advanced in political self-determination and possibly heading for nationhood. Despite this, the Inuit of Greenland still face an undiminished challenge from mental health issues such as youth suicides, sexual abuse and misuse of alcohol.

We have shown parallel developments of suicides, alcohol problems and sexual abuse in childhood with post-colonial development, in particular population increase, urbanization and increase in the proportion of migrant workers which started in the 1950s and accelerated in the 1960s. Alcohol problems, child sexual abuse and suicides were manifest from the 1960s and although the demographic changes described above have stabilized, these health issues have not improved. It is well known that psychological trauma is inherited and it is a likely explanation that the parenting skills of the 1960 to 1990 generation have been damaged and that the effects of those years will linger for generations.

Our findings indicate that colonization is far from over when colonization status has legally ended. It is rather the case at least in Greenland that the attempts at “modernizing” a previous colony despite the successful creation of infrastructure, health services etc. have caused social havoc and poor mental health. It is thus important to include both the colonial and the post-colonial periods in studies of the “colonization complex” and to keep in mind the transgenerational effects on health and social conditions.

We have shown strong associations of suicidal thoughts with self-reported sexual abuse during childhood and for men with alcohol problems in the childhood home. We have also shown strong associations of sexual abuse in childhood with alcohol problems in the childhood home. These associations point towards an integrated complex of adult mental health

and adverse childhood conditions which suggest that childhood conditions influence adult mental health.

Lynge (1997) concluded that many young psychiatric cases had been exposed to neglect, alcoholism and changing childhood environments. An epidemiological overview of suicides in Greenland until 1999 concluded that although the increase in suicides coincided with the modernization after 1950 it was not possible to pin point any specific components of modernization as main causes of the increase in suicide rates (Bjerregaard & Lynge 2006).

The gender aspect is principal and epidemiological analyses of men and women together or with statistical control for sex would have obscured many relevant observations. It is particularly salient that studies of completed suicides only have often lead to the conclusion that suicides are a problem among young men while the likewise high rates among young women have been somewhat ignored. The prevalence of suicidal thoughts is as high among women as among men but women apparently more often than men refrain from acting upon the ideation. Unfortunately there is little knowledge about suicidal attempts in Greenland which might cast more light on the gender issue. It is furthermore intriguing that in univariate analyses the associations between potential risk factors and recent suicidal thoughts were stronger and more often statistically significant among women than among men.

The regional differences in the prevalence of recent suicidal thoughts (among women) did not remain in the statistical models after control for sexual abuse but a high although not statistically significant risk of sexual abuse was contingent on growing up in East Greenland and on currently living outside the capital. Despite the lack of significance between region and recent suicidal thoughts, regional differences remain an important aspect to keep in mind when studying issues of mental health among the Inuit because of differences in living conditions and access to improving social status through education, job opportunities and proper housing (Riva *et al.* 2014). Both variations within regions and the differences across regions are without doubt important upstream determinants of health in modern Greenland. To improve our understanding of the possible interaction between region and mental health and the differences between men and woman as to how traumatic experiences during childhood are manifested as mental health issues later in life, the population based studies should be combined with qualitative interviews focused on how the connection between childhood conditions, the place you grow up, generational differences and gender perspectives are perceived at an individual level and among social groups.

A high socioeconomic position (household affluence) offered some protection against suicidal thoughts but given the cross sectional nature of the data the results may also be interpreted the other way round, that a heavy burden of childhood exposure and mental health problems make it more difficult to finish an education and obtain a high social position. The latter was concluded from results similar to ours in a recent study of sexual abuse of children in Greenland (Christensen & Baviskar 2015).

The strengths of the study include good countrywide data on exposure and mortality as far back as the 1970s which was only a few years after the start of the post-colonial societal development.

The Health Survey in 2014 comprised communities of all sizes from both West and East Greenland and is as such representative of the whole country. The sample was drawn at random from the selected communities but with a participation rate of 63 per cent there is a risk that differential non-participation may affect the results. It was shown that the participation rate was lower for men than for women and that young people (18–34 years) were underrepresented (Dahl-Petersen *et al.* 2016). Furthermore, non-participants had less education and more often smoked while drinking patterns and self-reported health did not differ significantly. The differences between participants and non-participants were small and while it is possible that non-participants had higher prevalence of suicidal thoughts and adverse childhood conditions, it is not probable that the associations among these variables are fundamentally different.

The main weakness of the study is that the causality of colonial stress on living conditions during the 1960s and 1970s is only inferential. Furthermore it is a methodological challenge in a cross sectional study to causally connect information about childhood conditions with information about suicidal thoughts in the same study. One important aspect of colonization was not included in our study, that is discrimination. A study from 1963 on relationships between Greenlanders and Danes in Greenland analysed the perception of differential treatment of either group. Not surprisingly both groups expressed feelings of differential treatment by the other group up to the level of discrimination (Udvalget for samfundsforskning i Grønland 1963: 74). This theme has never been included in health studies in Greenland but studies among the Norwegian Sami have showed associations between self-perceived discrimination and several negative health outcomes (Hansen 2015).

Future population health surveys should include questions on perceived colonial and post-colonial stress and questions on perceived discrimination. The existing data include additional data on other aspects of mental health, for instance Goldberg's General Health Questionnaire, and

additional descriptors of childhood conditions such as, for example, parents' residence and job, internal migration and language proficiency. Associations between these variables should be further analysed.

Conclusion

Colonization and living conditions during the post-colonial period exerted a profound and long lasting negative influence on the present day mental health of the Inuit in Greenland. In particular, a childhood with exposure to alcohol misuse and sexual abuse was linked to suicidal behaviour in adult life. The results further illustrate that it is not only extensive colonial stress such as genocide and loss of language and culture that has negative effects on mental health but also the more subtle stress factors that the Inuit in Greenland have been exposed to.

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