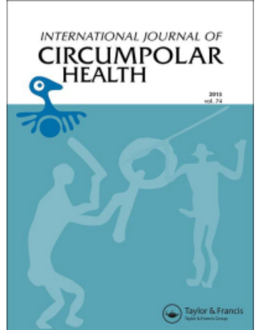

International Journal of Circumpolar Health

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/zich20

A systematic review on risk and protective factors for suicide and suicidal behaviour among Greenland Inuit

Ivalu Katajavaara Seidler, Nanna Lund Hansen, Arnârak Patricia Bloch & Christina Viskum Lytken Larsen

To cite this article: Ivalu Katajavaara Seidler, Nanna Lund Hansen, Arnârak Patricia Bloch & Christina Viskum Lytken Larsen (2023) A systematic review on risk and protective factors for suicide and suicidal behaviour among Greenland Inuit, International Journal of Circumpolar Health, 82:1, 2226284, DOI: 10.1080/22423982.2023.2226284

To link to this article: https://doi.org/10.1080/22423982.2023.2226284

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Published online: 21 Jun 2023.

Submit your article to this journal

Article views: 69

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=zich20

INTERNATIONAL JOURNAL OF CIRCUMPOLAR HEALTH
2023, VOL. 82, 2226284
https://doi.org/10.1080/22423982.2023.2226284

REVIEW ARTICLE (SCOPING AND SYSTEMATIC)

OPEN ACCESS

A systematic review on risk and protective factors for suicide and suicidal behaviour among Greenland Inuit

Ivalu Katajavaara Seidler [a,b], Nanna Lund Hansen[a], Arnârak Patricia Bloch[a] and Christina Viskum Lytken Larsen [a,b]

[a]National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark; [b]Institute of Health and Nature, University of Greenland, Nuuk, Greenland

ABSTRACT

Since the 1970s, suicide has been a major public health issue in Greenland. The World Health Organization has emphasised the importance of the identification of both risk and protective factors in relation to suicide. The aim of this paper was to identify scientific literature on risk and protective factors for suicide and suicidal behaviour among Greenland Inuit. Searches in PubMed and PsycInfo resulted in 420 studies that were screened by three of the authors. After screening, the authors included 15 studies that were subject to quality assessment and data extraction. All 15 studies reported on risk factors, and only three mentioned protective factors. Most reported risk factors were on an individual level and were related to socioeconomic status, mental health, alcohol and substance use, and life stress. Risk factors related to the family mainly related to adverse childhood experiences, while the community level concerned access to education, work, and conflicts. The results indicate a large knowledge gap about protective factors for suicide and suicidal behaviour. The few protective factors reported were related to men having a family, high socioeconomic status, and being born between 1901 and 1950.

ARTICLE HISTORY
Received 24 March 2023
Revised 23 May 2023
Accepted 13 June 2023

KEYWORDS
Suicide; suicidal behaviour; risk factor; protective factor; Inuit; Greenland

Introduction

The suicide rate in Greenland increased drastically during the 1970s. After being almost non-existent up until the 1960s, the rate started a rapid increase, peaking at 120 suicides per 100,000 persons annually at the end of the 1980s [1,2]. Since then, the rate has declined but remains at a very high level compared to global rates, and from 2015 to 2018 the rate was 81.3 suicides per 100,000 persons annually [3]. The age-standardised rate from the same period was 55.3 for women and 106 for men, while global age-standardised rates were 13.7 for men and 7.5 for women in 2016 [1,3]. Age and sex are important demographic factors associated with suicide. Suicide rates are highest among youth, particularly among young men aged 20–24 years [2,4]. Even though men have the highest rates, young women are strongly overrepresented in suicide attempts [5,6]. Statistics and recent research have shown an overall increase in female suicides [1]. As a result of historical events and societal changes in Greenland, suicide rates vary markedly between birth cohorts. Compared to people born in the 1940s, later generations have higher suicide rates and the age at which people die from suicide has become considerably lower [2]. The suicide rate varies further by geography, and the rates are highest in East and North Greenland, while the lowest rate is seen in the capital Nuuk [1,2]. The suicide rate in Greenland and the temporal changes have been linked to colonial history, rapid modernisation processes, intergenerational trauma, and grief [1,7–9].

The World Health Organization points to the importance of the identification of risk factors when addressing suicide and prevention. The accumulation of risk factors increases the risk of suicide, and risk factors can be addressed in different areas of prevention, depending on where they exist [10]. Further, there is an increased focus on the importance of protective factors for mental health and their potential in suicide prevention [10]. In an Arctic setting, the need to bring community and context into the perspective of health and mental health has been stressed, along with the inclusion of factors that enhance thriving communities [11–13].

CONTACT Ivalu Katajavaara Seidler ivalu@sdu.dk National institute of Public Health, University of Southern Denmark, Studiestræde 6, Copenhagen K 1455, Denmark

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Research on suicide in Greenland has been based on a wide range of study designs and, in general, on smaller subpopulations, making it difficult to create an overview of the different risk and protective factors related to suicide and related behaviours. A systematic review on suicide in Greenland was published in 2018; however, the aim was primarily to review descriptive epidemiological studies of young men compared to other demographic groups in Denmark and Greenland [4].

Aim

The aim of this systematic review is to generate a comprehensive overview of risk factors and protective factors for suicide and suicidal behaviour in Greenland based on published peer-review papers.

Materials and methods

The systematic review was based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the review protocol was registered in the international prospective register for systematic reviews, PROSEPRO [14,15].

Search strategy

A systematic search was conducted in PubMed and PsycINFO in June 2022 based on the search terms pre-sented in Table 1. PubMed is one of the largest data-bases for health research, including the MEDLINE database, while PsycINFO is a database with a narrower focus on psychology. The terms were selected to capture the widest possible array of peer-reviewed research literature. Greenland hosts a very

Table 1. Search terms.

Block 1	Block 2
Suicide	Inuit
Suicide attempt	Greenlander
Suicide ideation	Kalaallits
Suicidal thoughts	Kalaallit
	Greenland
	Arctic
	Circumpolar

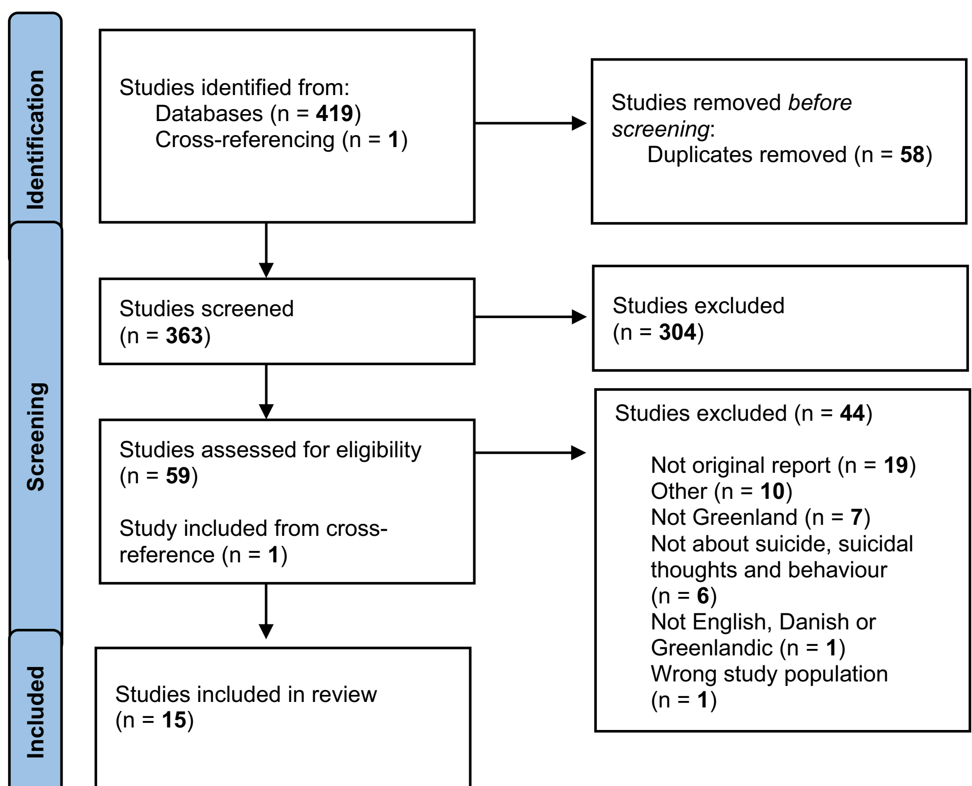

Figure 1. PRISMA 2020 flow diagram of study selection.

Box 1. Search string used in PubMed and PsycINFO.

PubMed

("Suicide"[Mesh] OR suicide[title/abstract] OR suicide attempt OR suicide ideation OR suicidal thought) AND ("Inuits"[Mesh] OR Inuit* OR Kalaallit* OR Greenlander OR Greenland[title/abstract] OR Arctic OR Circumpolar)*

PsycINFO

(exp Attempted Suicide/or exp Suicide/or suicide.mp. or suicide ideation.mp. or suicide attempt.mp. or suicidal thought×.mp.) and ((Greenlander or Inuit).mp. or exp Inuit/or Kalaallit×.mp. or Greenland.mp. or Circumpolar.mp. or Arctic.mp.)

small population of 56,000 people, which is reflected in the amount of published literature (Figure 1). No restrictions were placed on year of publication.

Every search term was searched for as a text word and, if possible, a MeSH term, after which all individual searches were combined into the search string presented in Box 1.

Wording and concepts

Since the outcome of interest was suicide and suicidal behaviour, search terms covered four related terms from *suicide* and *suicide attempt* to *suicide ideation* and *suicidal thoughts* (see Table 1). The distinction between suicidal thoughts and ideation is that ideation covers a behaviour characterised by ongoing thoughts of suicide and planning of the act. In the presentation of results, the umbrella term suicidal behaviour covers attempts, ideation, and thoughts. In the second part of the search block, the term *Kalaallit* is the Greenlandic word for the people of Greenland and translates directly into "Greenlander". In Greenlandic, the name of Greenland is Kalaallit Nunaat, translating into "The land of the Greenlanders".

Screening

This systematic review included peer-reviewed research literature in the synthesis of evidence. All identified literature from the search was imported into the online review tool COVIDENCE prior to screening to ensure a systematic and simple approach [16]. Three of the authors (IKS, NLH, and APB) conducted the screening and every paper had at least two screeners. In case of disagreement, the paper was discussed by all screening authors until an agreement was reached. Inclusion and exclusion criteria (Table 2) were uploaded into COVIDENCE and informed the initial screening process of title and abstract as well as the full-text review.

Relevant outcome measures were related to either suicidal thoughts, suicide attempts, or suicides. All studies presenting original research were of interest, excluding reviews and other forms of narrative synthesis. A study was excluded if the study population was a selected group, thus limiting the external validity of findings. In cases where a study presented both some form of synthesis and relevant analyses of original data, it was eligible for inclusion. Studies that did not present either risk factors or protective factors for suicide and suicidal behaviour but described solely geographical or demographic changes and patterns were excluded. All types of effect measures were included.

Data extraction

A data extraction tool was developed in Excel to collect information on publication details such as language, aim, study design, population, setting, method, outcome, analyses, and findings. The interrater variability was tested, and several training extractions were conducted. All data extractions were done by one reviewer and checked by a second reviewer to ensure all relevant information was collected for the synthesis. Disagreement between reviewers was discussed until consensus was attained.

Quality assessment

The quality of the included studies was assessed using a customised version of the Effective Public Health Practice Project Quality Assessment Tool [17]. Six of the ten quality assessment components were included: selection bias, study design, confounders, data collection methods, withdrawals and drop-outs, and analyses.

Table 2. Inclusion and exclusion criteria for screening.

Inclusion	Exclusion
• Studies on Greenland Inuit • Outcome is related to suicide, suicide ideation and risk factors and protective factors for suicide • Papers presenting original research • Language in English, Danish or Greenlandic	• Review • Not original report • Inference to general population not possible

All components could be rated from 1 to 3, where 1 equals strong, 2 moderate, and 3 weak. Not all components were relevant for all included studies due to their study design, and a score for the specific components was not included in the global rating. The global rating was rated from 1 to 3, and if a study was rated with a component rating of 3 twice or more the global rating was 3, hence the study quality was weak. A study scoring 3 in just one component had a global quality rating of 2 and was categorised with a moderate study quality. Studies that did not score any weak ratings received a global quality rating of 1 and were categorised as strong. As with the data extraction, all reviewers were trained in using the quality assessment procedure on the same papers to ensure consistency in ratings. All quality assessments were conducted by one reviewer and checked by another.

Results and context

The following results are presented on three main levels: family, individual, and community. Furthermore, a category called "other" covers factors not associated with the three levels. Figure 2 is presented based on the findings of the literature, where the family level is at the centre, followed by the individual and community levels. This is somewhat different from much public health research in which the individual is typically placed at the centre, as is the case in Bronfenbrenner's ecological systems model [18]. The ecological systems model was the inspiration for the development of the figurative summary of the results in this paper (see Figure 2). Placing family in the centre of the model illustrates that the first exposure to potential risk and protective factors will take place within the family environment. Not having the individual at the centre is in line with Inuit culture and values, where family and community come before the individual [12,13,19,20].

Results

Based on searches in the two databases, 420 studies were identified and screened. After removing 58 duplicates and 304 irrelevant studies in the screening of title and abstract, 47 studies went through full-text

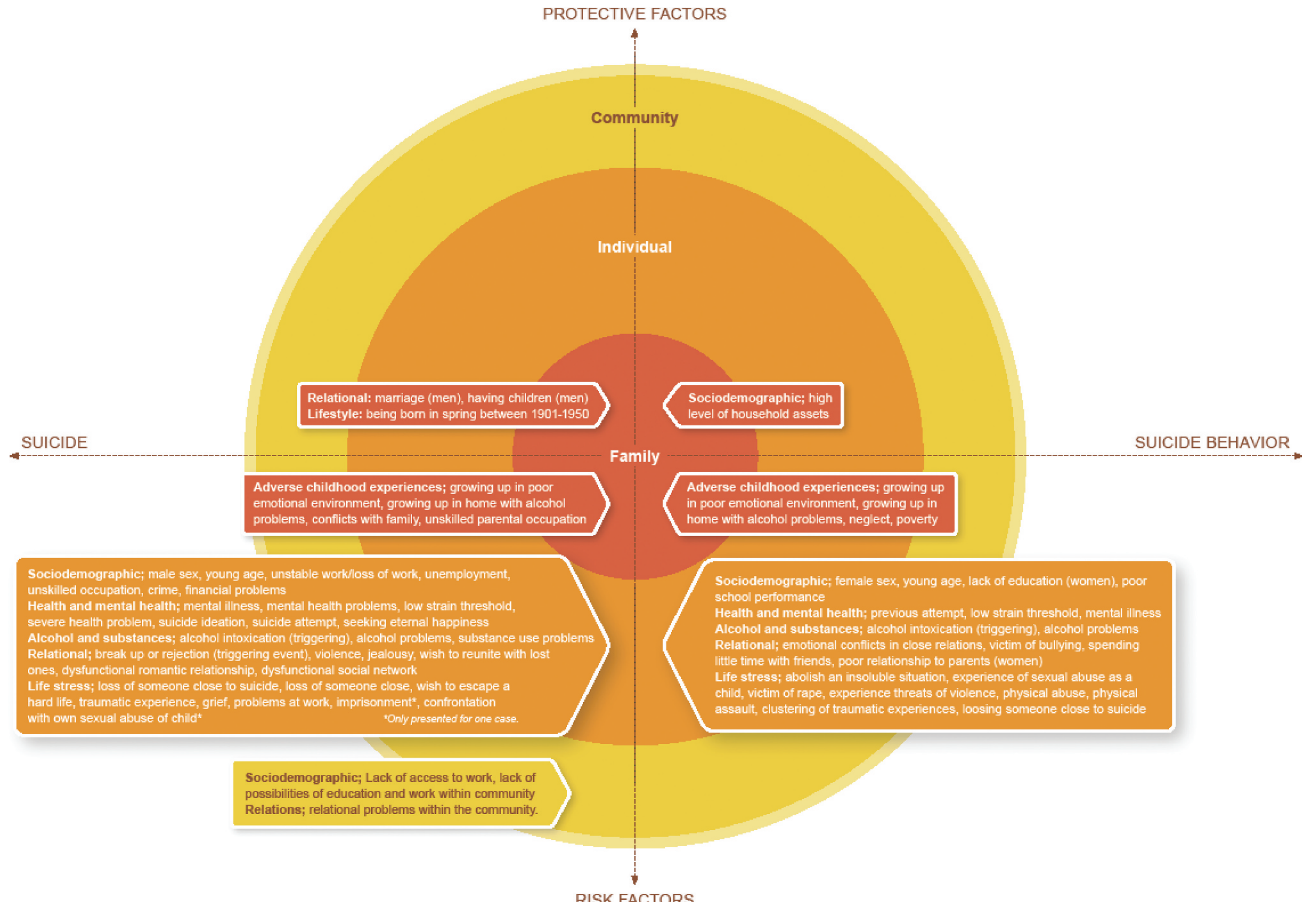

Figure 2. Overview of risk factors and protective factors for suicide and suicidal behavior on three levels: Family, Individual, and Community.

screening resulting in the inclusion of 15 studies (Figure 1). One study was identified though cross-referencing. Among the included studies, eight were published before 2010 and the latest in 2021. Many studies were excluded due to recurring analyses of previously published results, while others were excluded due to solely demographic outcomes, such as suicide rates according to calendar time. Studies were excluded if the exposure was a proxy measure, such as regional differences in rates, describing potential clustering effects of risk and protective factors.

Eight of the studies were focused on suicide as an outcome, while two studies focused more on either suicide or related behaviour and five only on the latter. Three studies were rated as weak, one study as moderate, and 11 were rated as having strong quality based on the quality assessment tool (Table 3). Weak rating was mostly given due to insufficient reporting of how results were analysed and obtained. Due to the inclusion of all study designs, the included studies were very heterogeneous and a meta-analysis could not be performed.

Figure 2 and Table 4 provide an overview of the identified risk and protective factors for suicide and suicidal behaviour.

Risk factors

Family level

Among both suicides and suicide attempts, it was often reported that people had grown up in a home characterised by quarrels, disharmony, and problems with alcohol

Table 3. Characteristics of included studies and their quality assessment score.

Author/ year/ title	Outcome	Study type	Study population (information on age)	Quality assessment score
[6].	Suicide and suicide attempts	Case-control study	Suicides $n = 12$Suicide attempts $n = 61$Controls $n = 41$(15+ years) Suicide attempts $n = 61$ Controls $n = 41$ (15+ years)	Weak
[21]	Suicide	Synthesis of police reports and death certificates	Suicides $n = 318$(15+ years) (15+ years)	Weak
[22]	Suicide	Synthesis of multiple data on suicides (public files, death certificates, police reports, files of the municipal welfare offices)	Suicides $n = 403$(10–60 years) (10–60 years)	Strong
[23]	Youth suicide	Public files, register and cross-sectional study	Suicides among youth $n = 184$Controls $n = 129$(15–30 years) Controls $n = 129$ (15–30 years)	Moderate
[7]	Suicidal thoughts	Cross-sectional study	Survey respondents $n = 2015$(18+ years) (18+ years)	Weak
[9]	Suicide	Synthesis of available data on suicides (death certificates and police reports)	Suicides $n = 139$(no information on age) (no information on age)	Strong
[24]	Suicide	Register study	Suicides $n = 833$(11–84 years, median = 25 years) (11–84 years, median = 25 years)	Strong
[25]	Suicide	Register study	Suicides $n = 1351$(11–84 years, median = 25 years) (11–84 years, median = 25 years)	Strong
[26]	Youth suicidal behaviour	Cross-sectional study	School students $n = 269$(12–18 years) (12–18 years)	Strong
[2]	Suicide and suicide thoughts	Register and survey study	Survey respondents $n = 3308$(18+ years) (18+ years)	Strong
[27]	Suicide	Register and census study	Suicides $n = 1354$(11–84 years, median = 27 years) (11–84 years, median = 27 years)	Strong
[8]	Suicidal thoughts	Cross-sectional study	Inuit survey participants $n = 1706$(18 + years) (18+ years)	Strong
[28]	Suicide	Register data and medical chart review study	Suicides $n = 160$Controls $n = 160$(15–72 years) Controls $n = 160$ (15–72 years)	Strong
[29]	Suicidal behaviour	Synthesis, cross-sectional and register study	Survey respondents $n = 1832$(15+ years) (15+ years)	Strong
[5]	Youth suicidal behaviour	Cross-sectional study (two separate surveys among young Sami and Inuit)	Youth $n = 399$(15–16 years) (15–16 years)	Strong

[6]. Among suicide victims, 18.2% had problems with either family or parents [9]. The experience of alcohol problems in the childhood home was associated with an odds ratio (OR) of ever having suicidal thoughts of 3.5 to 4 times higher than those who did not experience these problems growing up [7,8,29]. In a study of the clustering of traumatic events and suicide attempts, about half of the people in the high-risk group had experienced neglect growing up [26].

Table 4. Overview of risk factors and protective factors for suicide and suicidal behaviour.

Level	Risk factor	Protective factor
Suicide		
Family	**Adverse childhood experiences** • Growing up in poor emotional environment [6] • Growing up in home with alcohol problems [6] • Conflicts with family [9] • Unskilled parental occupation [23]	**Relational** • Marriage (men) [22]Having children (men) [22] • LifestyleBeing born in spring between 1901–1950 [27] **Lifestyle** • Being born in spring between 1901 and 1950 [27]
Individual	**Sociodemographic** • Male sex [2,22,24,25,28] • Young age [2,24,25,28] • Unstable work/loss of work [6] • Unemployment [6,9,22,23] • Unskilled occupation [22,23] • Crime [6] • Financial problems [9]	
	Health and mental health • Mental illness [6,9,21,22,25,28] • Mental health problems [6,21] • Low strain threshold [6] • Severe health problem [9] • Suicide ideation [2,9,21,28] • Suicide attempt [9,28] • Seeking eternal happiness [21]	
	Alcohol and substances • Alcohol intoxication (triggering) [6,9,21,23–25,28] • Alcohol problems [6,9,21,22,24,25] • Substance use problems [9]	
	Relational • Break up or rejection (triggering event) [,23] • Violence [21,28] • Jealousy [21] • Wish to reunite with lost ones [6,21] • Dysfunctional romantic relationship [9,22,23] • Dysfunctional social network [9]	
	Life stress • Loss of someone close to suicide [9,23] • Loss of someone close [21,22] • Wish to escape a hard life [6,21] • Traumatic experience [23] • Grief [21] • Problems at work [9] • Imprisonment* [9] • Confrontation with own sexual abuse of child* [9] * Only presented for one case.	
Community	**Sociodemographic** • Lack of access to work [23] • Lack of possibilities of education and work with-in community [23]	
	Relations • Relational problems within the community [9]	
Other	**Seasonality** • Summertime [24,25]	

(*Continued*)

Table 4. (Continued).

Level	Risk factor	Protective factor
Suicidal behaviour		
Family	**Adverse childhood experiences** • Growing up in poor emotional environment [6] • Growing up in home with alcohol problems [6–8,29] • Neglect [26] Poverty [8]	**Sociodemographic** • High level of household assets [8]
Individual	**Sociodemographic** • Female sex [2,5] • Young age [2,7] • Lack of education (women) [8] • Poor school performance [5] **Health and mental health** • Previous attempt [6] • Low strain threshold [6] • Mental illness [6,26] **Alcohol and substances** • Alcohol (triggering) [6] • Alcohol problems [6] **Relational** • Emotional conflicts in close relations [6] • Victim of bullying [26] • Spending little time with friends [5] • Poor relationship to parents (women) [5] **Life stress** • Abolish an insoluble situation [6] • Experience of sexual abuse as child [7,8] • Victim of rape [26] • Experience threats of violence [26] • Physical abuse [26] • Physical assault [26] • Clustering of traumatic experiences [26] • Loosing someone close to suicide [5]	

Suicide victims were more likely to have grown up in families where the parents were fishers, hunters, or unskilled workers, and suicidal thoughts were more prevalent in those families with the smallest number of household assets [8,23].

Individual level

Sociodemographic factors

There are clear patterns according to suicide and suicidal behaviour and sex, with highest rates of suicide among men and a higher prevalence of suicidal behaviour in women [22,24,25]. Men appear in suicide statistics two to three times more often than women, and young women are five to six times more likely to experience suicidal behaviour than young men [2,5,28]. Age is associated with both suicide and suicidal behaviour, and youth have the highest risk of experiencing either or both between the ages of 15–34 years, whereafter the risks start to decline with increasing age [2,7,24,25,28].

Occupational status is associated with suicide, and the most pronounced risk is seen in people who are unemployed or have unstable attachment to the labour market [6,9,22,23]. Both unstable attachment to the labour market and frequency of changing jobs were registered among 56% of the persons who died by suicide. Further, hunters, fishers and unskilled workers were overrepresented professions among those who died by suicide compared to white-collar workers, self-employed people, and skilled workers [22,23]. Unskilled workers had a higher risk of suicide in the summer months when less labour was available [22]. The prevalence of suicidal thoughts was higher among women with no education compared to those who had short or long education [8]. One quarter of women and three quarters of men who died by suicide were registered in a criminal register [6].

Alcohol and substance use

Alcohol is often mentioned in studies of suicides as either the presence of alcohol-related problems or as

a triggering factor for the act of suicide ranging between 32% and 75% among suicides overall and up to 90% among youth suicides. Often, alcohol functions as a trigger for the suicide in combination with breaking up with a partner, rejection, or a dysfunctional relationship to a partner characterised by conflict, violence, and jealousy [6,9,21,23–25,28]. Incidences of alcohol intoxication were estimated to increase suicide risk threefold, while incidences of violence increased the risk fourfold [28].

Health and mental health

Many studies report problems related to health and mental health as risk factors for both suicide and suicidal behaviour [6,9,21,22,25,26,28]. Mental illness such as depression, schizophrenia, psychosis, and alcohol problems were prevalent in approximately 25–29% of suicides, increasing the odds of suicide almost tenfold [22,25,28]. Among youth who met the criteria of a PTSD diagnosis, 44% had attempted suicide [26]. One study found that previous suicide attempts are seen in about 40% of the suicide attempts, while another study reported that those with suicidal ideation have a higher risk of committing suicide, but these instances constitute a small proportion of the suicides [2,6]. In a study of suicide and hospital-related contacts six months prior to the death, the highest OR of suicide was found in people with previous attempts (OR = 29.38), while suicide ideation had an OR of 22.7. Hospital-related contacts were not identified in two-thirds of all suicides [28].

Relational

Relational problems and conflicts are described as both triggering factors and risk factors, and breakups are frequently mentioned as the triggering factor preceding the suicide [9,21–23]. Dysfunctional romantic relationships are reported as risk factors along with dysfunctional social networks, while emotional conflicts in close relations were identified as a risk factor for suicidal behaviour [6,9,22,23]. One study reported that 35.5% of the suicides were characterised by problems with a partner and about 14% had been left by their respective partner prior to the suicide [9]. Two studies reported that some suicides were due to a wish to reunite with lost ones [6,21]. Among youth, being a victim of bullying and spending little time with friends were risk factors for suicidal behaviour, and having a poor relationship with parents was a risk factor among young women [5,26].

Life stress

Life stress is often mentioned as one or more traumatic experiences in the lives of suicide victims. Bereavement and grief are risk factors for suicide, and suicide-related bereavement was observed in 7.3% of suicides [9,21–23]. Among youth, losing someone close compared to someone who never experienced suicide was identified as a risk factor for suicidal behaviour, and 80% of youth had experienced such loss [5]. A wish to escape a hard life was reported in suicides, and suicide attempts were in some instances explained as a way of abolishing situations that were regarded as insolvable [6,21]. Among youth risk factors related to suicidal behaviour was the experience of violence or threats of violence and rape [26]. Three studies reported exposure to sexual assault as a child as being a risk factor for suicidal thoughts, increasing the risk by three times in men and four in women [8,26]. Combined with the experience of alcohol problems in the childhood home, the odds for suicidal thoughts were 28 times higher compared to someone who never experienced either [7]. Finally, the clustering of traumatic experiences was related to elevated risks of suicide attempts among youth [26].

Community level

Sociodemographic

One study on suicide reports that lack of access to education and employment are risk factors for suicide [23].

Relations

In 5.5% of the suicides, problems with friends or within the community were reported [9].

Other

Two of the included studies investigated suicide risk according to seasonality and reported that the number of suicides were found to peak during spring and summertime [24,25].

Protective factors

Family level

Among men, having children and being married were identified as protective factors against the risk of suicide [22]. Compared to those who had few household assets, those who belonged to the quartile with the highest number of household assets had the lowest prevalence of suicidal thoughts [8]. Being born between 1901 and 1950 in spring was found to be protective against the risk of suicide [27].

Discussion

All 15 included studies reported on risk factors for suicide and only three included results on protective factors, indicating a large knowledge gap on what protects people against suicide and suicidal behaviour. Risk factors at the family level included adverse childhood experiences, while the risk factors at a community level were lack of access to work and education, and relational conflicts within the community. Most of the risk factors were on the individual level. Some individual risk factors for suicide were reported more often than others, mostly life stress, problems with health and mental health, sociodemographic factors, and relational factors. Life stress was the most reported risk factor for suicidal behaviour, accounting for 32% of all reported risk factors. The clustering of traumatic experiences substantially increases the risk of both suicide and suicidal behaviour [26,28]. Triggering factors for suicide and suicide attempts are alcohol intoxication, often in combination with rejection, breaking up or conflict with a partner [6,9,21–25,28]. In many instances, risk factors identified in the three studies focusing on youth suicide and related behaviour were also identified as risk factors in samples not restricted by age, possibly reflecting that most suicides are seen among youth and young adults. Some risk factors for suicidal behaviour were only reported among youth, such as factors relating to school, parents, friends, bullying, and traumatic experiences (see Table 4). At a community level, lack of access to or possibilities for work and education were risk factors reported only in the one study reporting on youth suicide [23].

Most risk factors are at the individual level but are related to historical events and the development of the Greenlandic society. Differences in suicide risk depend on whether an individual was born between 1901 and 1950 or later, between 1961 and 1980, underline the impacts of the colonial history and rapid modernisation on suicide [27]. People who were born between 1901 and 1950 were more likely to have grown up in a small community with parents who subsisted on fishing and hunting [27]. The fact that studies on later time periods report that these types of parental occupation are risk factors could reflect the consequences of the rapid modernisation process and associated social disruption, where former highly recognised societal positions such as hunters and fishers were devalued in a society that now favoured education and skilled work [23]. According to Thorslund, assimilation and integration may have functioned as protective factors, and marginalisation in terms of occupation was associated with increased risk of suicide [22,23]. These findings could indicate that social determinants, such as low income from being a hunter or fisher, are important risk factors related to suicidal behaviour, limiting access to societal goods, and that related consequences counteract the protective effects of cultural practices embedded in such professions. Apart from affecting suicide risk through sunlight exposure, seasonality could work as a proxy for differences in social behaviour [24,25,27,30].

Many of the presented risk factors have been identified among other Inuit populations who share cultural traits, and to some extent a colonial history, with the Greenland Inuit. Mental health problems or illness, problems related to alcohol and substances, and a family history of suicide were more prevalent in suicide victims among Canadian and Alaskan Inuit [31,32]. Among Canadian Inuit, the experience of adverse childhood experiences (ACEs) was associated with an OR of suicide of 2.38 compared to controls [31]. ACEs and the experience of traumatic events were identified as risk factors in suicidal behaviour among Inuit youth in Canada, supporting the notion that ACEs and traumatic experiences are not only highly prevalent among Inuit but also strongly associated with suicidal behaviour [33]. Bjerregaard and Lynge observed that suicidal behaviour was more frequent among youth from dysfunctional homes characterised by a poor emotional environment, violence, and problems with alcohol use [34]. The dysfunctional family environment was linked to the negative consequences of the rapid modernisation of the Greenlandic society, resulting in intergenerational trauma, which is also known from other Indigenous populations in the Arctic [32,34–36]. ACEs are stressful and traumatic events such as sexual abuse, domestic violence, and other forms of domestic dysfunction, which can have significantly negative consequences on well-being in adult life [37–39]. ACEs are associated with a lifetime prevalence for depression of 23% and a population attributable risk fraction of 67% in lifetime risk of suicide attempts in Western non-Indigenous populations [37,38]. Studies of ACEs and risk of suicide attempt further show that having experienced just one ACE increases a lifetime risk of suicide attempt by 80%, while having experienced four or more ACEs is associated with a 12-fold increase [39]. A psychological autopsy report based on seven suicides in Tasiilaq (East Greenland) found that the suicides were related to ACEs and the loss of close relatives in childhood or adolescence [40]. Data from a health survey in 2014 showed that 66% of the adult population in Greenland had experienced ACEs, while this proportion was as high as 81% for adults born in the 1980s [41].

The high frequency and the type of prevalent ACEs in Greenland may contribute to the high level of suicidality among youth.

One inherent bias which could appear in the published literature is the tendency to apply a damage-centred perspective of suicide. While many authors succeed in placing suicide into a lager historical and colonial context, it is clear that little attention has been placed on strength-based approaches [42]. Much of the presented research has been done with little or no mentioning of the inclusion of the community in question. This may be caused by the inclusion of quantitative data and that many studies have been conducted in a time where there was little focus on engagement of Indigenous peoples and communities in health research [43].

Strengths and limitations

This review did not exclude studies based on their respective designs, resulting in a high level of heterogeneity and making cross-comparisons and validation of estimates difficult. Some publications did not even provide estimates but synthesised identified risk and protective factors or their prevalence. The authors of this paper chose not to discriminate between study designs to provide the most comprehensive overview of factors in a relatively small area of research and to ensure the most informative background for all scientific findings on risk and protective factors for suicide and suicidal behaviour.

Available information on risk and protective factors differs according to the outcome being suicide or suicidal behaviour. This refers to the nature of available information once a person has died, which in the case of suicide is often public records such as death certificates, police reports, and medical records. In some studies, the bereaved family members of suicide victims have been interviewed, providing a more detailed picture but also introducing a potential form of social disability bias. Bereaved might feel some responsibility for the situation leading up the suicide, making their testimonies less likely to reveal potential risk factors or family-related dysfunctions.

A challenge in the presented evidence on risk and protective factors is the wide study period, ranging from the first included publication in 1979 until the latest in 2021. In a rapidly changing and dynamic society, the living conditions differ across generations, and it is not a given that what was found to be risk factors for suicide in the beginning of the period of this review was similar across the time span of 22 years [44]. Many identified risk factors seem to reappear in publications across the study period, although it may be difficult to determine whether the individual effects of risk factors have changed over time.

Implications for future research

Research on suicide in Greenland started in the late 1970s, when researchers began to investigate the social pathology and potential characteristics of those who died by suicide [6]. Since then, various papers have been published, and the first national strategy for suicide prevention was initiated in 2005. The results of this review underline the need for more knowledge on the protective factors of suicide and suicidal behaviour. The lack of knowledge may reflect a damage-centred research approach that is currently being replaced by a desire and strength-based approach in much Indigenous research [42]. Much of the international and circumpolar research on suicide has turned towards the investigation of protective factors, facilitating the strength-based approaches [11,45]. In the Arctic context, protective factors against suicide are focused on enhancing well-being and mental health and have been linked to cultural knowledge and practices, transgenerational relations, and healthy families and communities [46,47]. Even though research on protective factors against suicide and suicidal behaviour is still scarce in a Greenlandic context, a report on youth mental health from 2021 confirms that youth who have strong cultural connections have a better mental health status than those who do not have such connections [48]. Today, many interventions among Indigenous people incorporate protective factors on many levels to enhance youth mental health [13]. Understanding the ancestral history, intergenerational learning, and the transmission of both knowledge and values, focus on relations, and connectedness to culture, community, and surroundings, and a focus on strength-based interactions in intermediate surrounding and distant contexts are important elements that could be incorporated into future preventive strategies [13,19]. Research has shown that protective factors can not only increase well-being, but they can moderate the negative effects that ACEs may have on health and well-being [49]. In suicidal behaviour among youth, it was reported that family communication and school connectedness were associated with a lower prevalence among those who had been exposed to ACEs [50]. Among Indigenous circumpolar youth,

protective factors have been identified as having positive role models, feeling useful and contributing to community, belief in oneself, the practice of traditional skills, and the holding of traditional knowledge [47]. A mapping of protective factors against suicide and suicidal behaviour is needed in a Greenlandic context and research needs to be done on their potential to prevent suicide. The identification of protective factors requires dialogue and partnering with youth and communities as well as relevant actors working with youth and mental health. A participatory approach and culturally relevant methodology are crucial for this work to be done in a meaningful and respectful way.

The identified risk factors cover many different aspects of life from socioeconomic position to ACEs, testifying that suicide and related behaviour are complex problems with individual stories and life trajectories. However, many of the identified risk factors are both detectable and preventable from a public health perspective. A national preventive strategy should aim at a multi-level approach addressing risk factors and promoting protective factors in a culturally relevant manner, making sure that prevention is sustainable and resonates with the population and all relevant actors delivering or co-creating the preventive efforts [51]. Today, Greenland is developing a new suicide prevention strategy that incorporates initiatives related to both risk and protective factors, with a particular focus on youth voices, cultural relevance, and the promotion of mental well-being. The strategy is to be completed during the first half of 2023.

Based on the evidence from 15 studies on risk and protective factors for suicide and suicidal behaviour in Greenland, it is evident that suicide is a complex problem and that there is a knowledge gap on protective factors for suicide and suicidal behaviour. Most risk factors have been reported on the individual level, but no protective factors were reported on this level. Mostly, the family level covered risk factors related to ACEs, while the community-level risk factors covered lack of access to education and work. The few protective factors were found on the family level, encouraging future research and prevention to enhance these factors.

Acknowledgments

The study was financed as a part of a PhD project by the Ministry of Education and Research – Danish State Funds for Arctic Research and a faculty scholarship by the University of Southern Denmark. The funding bodies played no role in the study design, data collection, analyses, interpretation, or writing of the manuscript.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The work was supported by the Ministry of Education and Research – Danish State Funds for Arctic Research [80.30]; Syddansk Universitet [SDU-2020-83 - (1878)].

Ethical considerations

The study is part of a PhD project and was approved by two institutional boards in Greenland and in Denmark. In Greenland, the project has been approved by the Committee of Research Ethics in Greenland (KVUG 2018–16). In Denmark, the study is approved by the legal services of the University of Southern Denmark, notification number 11.266. The author group consists of both Indigenous and non-Indigenous scholars who are part of a research group grounded in the Greenlandic community.

ORCID

Ivalu Katajavaara Seidler http://orcid.org/0000-0002-4956-6326
Christina Viskum Lytken Larsen http://orcid.org/0000-0002-6245-4222

References

[1] Seidler IK, Tolstrup JS, Bjerregaard P, et al. Time trends and geographical patterns in suicide among Greenland Inuit. BMC Psychiatry. 2023;23(1):187. doi:10.1186/s12888-023-04675-2.

[2] Bjerregaard P, Larsen CV. Time trend by region of suicides and suicidal thoughts among Greenland Inuit. Int J Circumpolar Health. 2015;74(1):26053. doi:10.3402/ijch.v74.26053.

[3] World Health O. Suicide in the world: global health estimates. Geneva: World Health Organization; 2019.

[4] Sargeant H, Forsyth R, Pitman A. The epidemiology of suicide in young men in Greenland: a systematic review. Int J Environ Res Public Health. 2018;15(11):2442. doi:10.3390/ijerph15112442.

[5] Granheim IPH, Silviken A, Larsen CVL, et al. Sociodemographic, psychosocial and environmental factors associated with suicidal behaviour in indigenous Sami and Greenlandic Inuit adolescents; the WBYG and NAAHS studies. Int J Circumpolar Health. 2021;80(1):1913939. doi:10.1080/22423982.2021.1913939.

[6] Grove O, Lynge J. Suicide and attempted suicide in Greenland. A controlled study in Nuuk (Godthaab). Acta Psychiatr Scand. 1979;60(4):375–391. doi:10.1111/j.1600-0447.1979.tb00286.x.

[7] Bjerregaard P. Rapid socio-cultural change and health in the Arctic. Int J Circumpolar Health. 2001;60(2):102–111. doi:10.1080/25761900.2022.12220580.

[8] Bjerregaard P, Larsen CVL. Health aspects of colonization and the post-colonial period in Greenland 1721 to 2014. J Northern Stud. 2016;10:85–106.
[9] Leineweber M, Bjerregaard P, Baerveldt C, et al. Suicide in a society in transition. Int J Circumpolar Health. 2001;60 (2):280–287. DOI:10.1080/25761900.2022.12220605
[10] World Health Organization. Preventing suicide: a global imperative. Geneva, Switzerland: World Health Organization; 2014.
[11] Cueva K, Rink E, Lavoie JG, et al. Diving below the surface: a framework for arctic health research to support thriving communities. Scand J Public Health. 2021;1–10. DOI:10.1177/14034948211007694
[12] Healy G, Tagak A Sr. PILIRIQATIGIINNIQ 'Working in a collaborative way for the common good': a perspective on the space where health research methodology and Inuit epistemology come together. Int J Crit Indigenous Stud. 2014;7(1):1–14. doi:10.5204/ijcis.v7i1.117.
[13] O'keefe VM, Fish J, Maudrie TL, et al. Centering indigenous knowledges and worldviews: applying the indigenist ecological systems model to youth mental health and wellness research and programs. Int J Environ Res Public Health. 2022;19(10):6271. DOI:10.3390/ijerph19106271
[14] Centre For Reviews And Dissemination. 2022. *PROSPERO - International prospective register of systematic reviews* [Online]. York, United Kingdom: University of York. Available: https://www.crd.york.ac.uk/prospero/[Accessed].
[15] Page MJ, Mckenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71. DOI:10.1136/bmj.n71
[16] Veritas Health Innovation. Covidence systematic review software. Melbourne; 2022.
[17] Thomas BH, Ciliska D, Dobbins M, et al. A process for systematically reviewing the literature: providing the research evidence for public health nursing interventions. Worldviews Evid Based Nurs. 2004;1 (3):176–184. doi:10.1111/j.1524-475X.2004.04006.x.
[18] Bronfenbrenner U. Ecological models of human development. International Encyclopedia Of Education. 1994;3:37–43.
[19] Fish J, Hirsch G, Syed M. "Walking in two worlds": toward an indigenist ecological systems model for group therapy. Counse Psychol. 2022;50(5):622–648. doi:10.1177/00110000221083028.
[20] Karetak JTF, Tagalik S. Inuit Qaujimajatuqangit - What inuit have always known to be true. Halifax, Canada: Fernwood Publishing; 2017.
[21] Lynge I. Suicide in Greenland. Arctic Med Res. 1985;40:53–60.
[22] Thorslund J. Inuit suicides in Greenland. Arctic Med Res. 1990;49(1):25–33.
[23] Thorslund J. Suicide among Inuit youth in Greenland 1977-86. Arctic Med Res. 1991;Suppl:299–302.
[24] Björkstén KS, Bjerregaard P, Kripke DF. Suicides in the midnight sun—a study of seasonality in suicides in West Greenland. Psychiatry Res. 2005;133(2–3):205–213. doi:10.1016/j.psychres.2004.12.002.
[25] Björkstén KS, Kripke DF, Bjerregaard P. Accentuation of suicides but not homicides with rising latitudes of Greenland in the sunny months. BMC Psychiatry. 2009;9 (1):20. doi:10.1186/1471-244X-9-20.
[26] Karsberg S, Armour C, Elklit A. Patterns of victimization, suicide attempt, and posttraumatic stress disorder in Greenlandic adolescents: a latent class analysis. Soc Psychiatry Psychiatr Epidemiol. 2014;49(9):1389–1399. doi:10.1007/s00127-014-0890-4.
[27] Björkstén KS, Bjerregaard P. Season of birth is different in Inuit suicide victims born into traditional than into modern lifestyle: a register study from Greenland. BMC Psychiatry. 2015;15(1):147. doi:10.1186/s12888-015-0506-x.
[28] Grundsøe TL, Pedersen ML. Risk factors observed in health care system 6 months prior completed suicide. Int J Circumpolar Health. 2019;78(1):1617019. doi:10.1080/22423982.2019.1617019.
[29] Bjerregaard P, Larsen CVL, Sørensen IK, et al. Alcohol in Greenland 1950-2018: consumption, drinking patterns, and consequences. Int J Circumpolar Health. 2020;79 (1):1814550. doi:10.1080/22423982.2020.1814550.
[30] Bjerregaard P. Geographic variation of mortality in Greenland. Economic and demographic correlations. Arctic Med Res. 1990;49(1):16–24.
[31] Chachamovich E, Kirmayer LJ, Haggarty JM, et al. Suicide among Inuit: results from a large, epidemiologically representative follow-back study in Nunavut. Can J Psychiatry. 2015;60(6):268–275. DOI:10.1177/070674371506000605
[32] Wexler L, Silveira ML, Bertone-Johnson E. Factors associated with Alaska native fatal and nonfatal suicidal behaviors 2001–2009: trends and implications for prevention. Arch Suicide Res. 2012;16(4):273–286. doi:10.1080/13811118.2013.722051.
[33] Kirmayer LJ, Malus M, Boothroyd LJ. Suicide attempts among Inuit youth: a community survey of prevalence and risk factors. Acta Psychiatr Scand. 1996;94(1):8–17. doi:10.1111/j.1600-0447.1996.tb09818.x.
[34] Bjerregaard P, Lynge I. Suicide—A challenge in modern Greenland. Arch Suicide Res. 2006;10(2):209–220. doi:10.1080/13811110600558265.
[35] Hicks J. The social determinants of elevated rates of suicide among Inuit youth. Indigenous Affairs. 2007;4:30–37.
[36] Wexler L. Looking across three generations of Alaska natives to explore how culture fosters indigenous resilience. Transcult Psychiatry. 2013;51(1):73–92. doi:10.1177/1363461513497417.
[37] Chapman DP, Whitfield CL, Felitti VJ, et al. Adverse childhood experiences and the risk of depressive disorders in adulthood. J Affect Disord. 2004;82(2):217–225. DOI:10.1016/j.jad.2003.12.013
[38] Dube SR, Anda RF, Felitti VJ, et al. Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: findings from the adverse childhood experiences study. JAMA. 2001;286 (24):3089–3096. DOI:10.1001/jama.286.24.3089
[39] Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the Adverse Childhood Experiences (ACE) study. Am J Prev Med. 1998;14(4):245–258. DOI:10.1016/S0749-3797(98)00017-8
[40] Lindholm J, Pleisner JJ. Psykologisk autoposistudie af de 7 selvmord i Tasiilaq i 2011 (Psychological autopsy study

of the 7 suicides in Tasiilaq in 2011) [In Danish]. Nakorsanut. 2013;38:22–23.
[41] Dahl-Petersen I, Larsen C, Nielsen N, et al. Befolkningsundersøgelsen i Grønland 2014. Levevilkår, livsstil og helbred. (Population Health Survey in Greenland 2014. Living conditions, lifestyle, and health.) [In Danish and Greenlandic]. Nr. 28 ed. Copenhagen, Denmark: National Institute of Public Health; 2016.
[42] Tuck E. Suspending damage: a letter to communities. Harvard Educational Review. 2009;79(3):409–428. doi:10.17763/haer.79.3.n0016675661t3n15.
[43] Lavoie J, Stoor JP, Cueva K, et al. Indigenous engagement in health research in Circumpolar Countries: an analysis of existing ethical guidelines. Int Indig Policy J. 2022;13(1):13. doi:10.18584/iipj.2022.13.1.10928.
[44] Bjerregaard P, Curtis T. Cultural change and mental health in Greenland: the association of childhood conditions, language, and urbanization with mental health and suicidal thoughts among the Inuit of Greenland. Soc Sci Med. 2002;54(1):33–48. doi:10.1016/S0277-9536(01)00005-3.
[45] Cueva K, Rink E, Lavoie JG, et al. From resilient to thriving: policy recommendations to support health and well-being in the Arctic. Arctic. 2022;74(4):550–558. doi:10.14430/arctic73953.
[46] Ingemann C, Larsen CVL. Well-being among indigenous children and youth in the Arctic–with a focus on Sami and Greenland Inuit: a scoping review. Copenhagen, Denmark: Nordic Council of Ministers, Nordic Council of Ministers Secretariat; 2018.
[47] Macdonald JP, Ford JD, Willox AC, et al. A review of protective factors and causal mechanisms that enhance the mental health of Indigenous Circumpolar youth. Int J Circumpolar Health. 2013;72(1):21775. DOI:10.3402/ijch.v72i0.21775
[48] Ottendahl CB, Bjerregaard P, Svartá DL, et al. Mental sundhed og helbred blandt 15-34 årige i Grønland. Betydningen af opvækstvilkår, beskyttende faktorer og risikofaktorer (Mental health and health among 15-34 year olds in Greenland. The importance of childhood conditions, protective factors and risk factors.) [In Danish and Greenlandic]. Copenhagen, Denmark: National Institute of Public Health, Univerisy of Southern Denmark; 2021.
[49] Crandall A, Miller JR, Cheung A, et al. Aces and counter-ACEs: how positive and negative childhood experiences influence adult health. Child Abuse & Neglect. 2019;96:104089–-104089. DOI:10.1016/j.chiabu.2019.104089
[50] Lensch T, Clements-Nolle K, Oman RF, et al. Adverse childhood experiences and suicidal behaviors among youth: the buffering influence of family communication and school connectedness. J Adolesc Health. 2021;68(5):945–952. DOI:10.1016/j.jadohealth.2020.08.024
[51] Crawford A. Inuit take action towards suicide prevention. Lancet. 2016;388(10049):1036–1038. doi:10.1016/S0140-6736(16)31463-5.