

Etiology

Original Research Paper

Cite this article: Logie CH, Lys CL, Sokolovic N, Mackay KI, Donkers H, Kanbari A, Pooyak S, Loppie C (2021). Contextual factors associated with depression among Northern and Indigenous adolescents in the Northwest Territories, Canada. *Global Mental Health* 8, e22, 1–10. <https://doi.org/10.1017/gmh.2021.21>

Received: 18 January 2021

Revised: 25 May 2021

Accepted: 26 May 2021

Keywords:

Depression; adolescents; Arctic; food insecurity; dating violence; sexual orientation; gender; Canada

Author for correspondence:

Carmen H. Logie,

E-mail: carmen.logie@utoronto.ca

Contextual factors associated with depression among Northern and Indigenous adolescents in the Northwest Territories, Canada

Carmen H. Logie^{1,2,3} , Candice L. Lys⁴, Nina Sokolovic⁵ ,

Kayley Inuksuk Mackay⁴, Holly Donkers¹, Amanda Kanbari⁴, Sherri Pooyak⁶ and Charlotte Loppie⁷

¹Factor-Inwentash Faculty of Social Work, University of Toronto, Toronto, Canada; ²Women's College Research Institute, Women's College Hospital, Toronto, Canada; ³United Nations University Institute of Water, Environment & Health, United Nations University, Hamilton, Canada; ⁴Fostering Open eXpression among Youth (FOXY), Yellowknife, Northwest Territories, Canada; ⁵Ontario Institute for Studies in Education, University of Toronto, Toronto, Canada; ⁶Canadian Aboriginal AIDS Network (CAAN), Vancouver, Canada and ⁷School of Public Health and Social Policy, University of Victoria, Victoria, Canada

Abstract

Background. Persons in Arctic regions disproportionately experience depression. Knowledge gaps remain regarding factors associated with depression among adolescents in the Northwest Territories (NWT), Canada, where child and adolescent mental health hospitalizations are nearly 2.5 times the national rate. This study assesses correlates of depression among adolescents in the NWT.

Methods. We conducted a cross-sectional survey with adolescents aged 13–18 in 17 NWT communities. We assessed associations between socio-demographic characteristics, dating violence, food insecurity and depression, measured with the 9-item Patient Health Questionnaire. We conducted ordered logistic regressions to assess associations with no, mild, or moderate/severe depression scores.

Results. Participants ($n = 399$; mean age: 14.3, s.d.: 1.3) were mostly Indigenous (79%) and 45% reported food insecurity. Nearly half (47%) reported minimal/no depression symptoms, 25% mild symptoms and 28% moderate/severe symptoms. In multivariate analyses, participants who were cisgender women compared to other genders, sexually diverse *v.* heterosexual, and food insecure had double the odds of more severe depression symptoms. Among those dating, dating violence was associated with double the odds of moderate/severe depression symptoms.

Conclusions. Findings support tailored interventions to address material (food insecurity), relational (dating violence) and symbolic (gender and sexual orientation norms) contextual factors associated with depression among adolescents in the NWT.

Background

Advancing mental health among adolescents in Arctic regions is a global priority (Collins *et al.*, 2017; Trout and Wexler, 2020). Arctic populations are disproportionately impacted by mental health challenges compared with non-Arctic counterparts (Lehti *et al.*, 2009; Collins *et al.*, 2017; Trout and Wexler, 2020). There are longstanding challenges realizing optimal social determinants of health in Arctic regions, particularly housing, food security and healthcare access (Collins *et al.*, 2017). Social determinants of health may play a particularly important role in shaping psychosocial stressors in the Arctic. For instance, crowded housing conditions among Inuit in Greenland were associated with poorer mental health, and this was exacerbated among women (Riva *et al.*, 2014). Among Inuit youth in Nunavik, Canada, lower income and challenges finding animals to hunt were associated with poorer mental wellness, whereas cultural pride and positive social interaction were protective factors linked with improved mental wellbeing (Gray *et al.*, 2016). Understanding factors associated with depression among Arctic youth is especially relevant during the COVID-19 pandemic, which may exacerbate pre-existing mental health disparities (Polsky and Gilmour, 2020; The Arctic Council, 2020).

Among adolescents, depression is one of the most common mental health challenges and a suicide risk factor, with onset usually in mid-to-late adolescence (Petito *et al.*, 2020). It is critical to halt psychological distress and promote wellbeing among adolescents. Chronic psychological stress among adolescents has harmful impacts on neurobiological systems that are connected with emotional and behavioral regulation across the lifecourse (De Bellis, 2001). Without treatment, depression can harm educational and social outcomes, and may contribute

to other health concerns such as smoking and substance use (Petito *et al.*, 2020). Depression usually impacts youth during mid-to-late adolescence, hence identifying illness and early intervention can reduce the likelihood that adolescents will develop severe depression or other psychosocial challenges (Petito *et al.*, 2020). There are concerns that depression may be increasing among adolescents over time in North America, and in turn there may be an elevated number of young people with untreated depression (Mojtabai *et al.*, 2016; Lu, 2019).

In systematic reviews, food insecurity is associated with an increased risk of depression (Pourmotabbed *et al.*, 2020), as is intimate partner violence (Beydoun *et al.*, 2012; Devries *et al.*, 2013), both disproportionately affecting persons in the Northwest Territories (NWT), Canada (Moffitt and Fikowski, 2017; Tarasuk and Mitchell, 2020). Food insecurity refers to a lack of access to sufficient quantity and quality of food (Pryor *et al.*, 2016). Rates of food insecurity in Canada are higher among Indigenous people than non-Indigenous counterparts and higher in Northern Canada than the country as a whole (Subnath, 2017). Approximately one in six people in the NWT and Yukon experience food insecurity (Tarasuk *et al.*, 2019). A study in Nunavik reported that severe household food insecurity in adolescence was associated with the concurrent symptoms of depression and withdrawn attitude, and adolescents who experienced persistent household food insecurity during childhood and adolescence reported increased depression and anxiety (Bradette-Laplante *et al.*, 2020). A national population-based study with the Canadian Community Health Survey found that severe food insecurity was consistently associated with increased mortality from suicide (Men *et al.*, 2020). Between 2017 and 2018, rates of household food insecurity were 15.9% in the NWT, 1.8-fold higher than that of the national average of 8.8% (Statistics Canada, 2020). Interpersonal violence among women in the NWT is 10-fold the national rate at 18.9 admissions per 1000, with rates of 15.6/1000 for youth aged 15–24 (Government of Northwest Territories, 2019).

Depression is particularly important to understand among Northern and Indigenous youth in the NWT, which has a population of approximately 44 469 persons; the proportion of youth under 15 years in the NWT is 22%, *v.* the national average of 16% (Government of Northwest Territories, 2016a). The NWT encompasses the second largest proportion of Indigenous residents in Canada, comprising 50% of the population and including Dene (33%), Inuit (11%) and Métis (6%) communities (Government of Northwest Territories, 2016a). Self-perceived mental health, rating one's mental health as good or excellent, was lower in the NWT (59%) than the national average (69%), and lower among Indigenous persons (48%) than non-Indigenous persons (72%) (Government of Northwest Territories, 2014). Mental health hospitalizations among children and youth in the NWT are almost 2.5-fold higher than the national rate (11.7 per 1000 population *v.* 4.7) and highest among those 15–17 years (23.3/1000 population) (Government of Northwest Territories, 2019).

Socio-historic and contextual determinants may explain some of these mental health trends. In particular, colonial violence practices such as state-sanctioned residential schools, forced assimilation and family separation produce intergenerational harms for Indigenous persons (Bjerregaard, 2001; Lehti *et al.*, 2009), including changes in kinship structures and lasting effects of trauma and abuse (Chenhall and Senior, 2009; Kirmayer *et al.*, 2011; Bellamy and Hardy, 2015). Many consider colonial practices

ongoing in Canada, evidenced in the disproportionate involvement of Indigenous children in the child welfare system (Ma, 2020), racialized and sexualized violence underpinning the missing and murdered Indigenous women crisis (Razack, 2016), and overrepresentation of Indigenous people who are incarcerated (Chartrand, 2019).

Despite contextual challenges, there is individual and collective resilience among NWT communities and a focus on strengthening connection to culture, identities and land (Kirmayer *et al.*, 2011; Government of Northwest Territories, 2016b; McCalman *et al.*, 2020). Resilience is identified as a key domain of adolescent wellbeing, and includes the opportunity to build capacity and skills to manage adversity (Ross *et al.*, 2020). Social ecological approaches to resilience view it as shaped in larger contexts (Ungar, 2011), and this lens has been applied to understand land, nature, community and culture as sources of resilience among Indigenous youth and youth in Northern regions (Allen *et al.*, 2014; Gray *et al.*, 2016; Hatala *et al.*, 2020). Yet, there is a lack of research examining contextual factors associated with depression among adolescents in the NWT, which is required to inform tailored intervention strategies.

This analysis aims to address these knowledge gaps informed by a social contextual theoretical framework (Campbell and Cornish, 2012; Campbell *et al.*, 2013; Gibbs *et al.*, 2018). Rooted in Freire's focus on community engagement to understand the root causes of poor health and to transform power inequities (Freire, 1972), Campbell and Cornish (2012) conceptualized health enabling environments as 'contexts which support and enable health-enhancing attitude and behaviour change' (p. 848). There are multiple dimensions of health-enabling contexts, including: *symbolic* contexts that shape socio-cultural values and beliefs, including what groups are valued and respected, such as those reinscribed by gender norms; *material* contexts, referring to access to resources, such as food and financial security and *relational* contexts, which include social capital within communities, and social relationships between peers, families and others (Campbell and Cornish, 2012; Gibbs *et al.*, 2018). The social and health inequities in the NWT discussed above regarding mental health, food insecurity and intimate partner violence, signal the utility of a social contextual approach in identifying how the wider social context shapes wellbeing among adolescents.

We examined *material contexts*, including access to resources, through assessing food insecurity and urban/rural location, as both food insecurity (Pourmotabbed *et al.*, 2020) and remoteness (Mendez *et al.*, 2013) have been associated with poorer mental health in prior research. We also examined *relational contexts*, referring to interpersonal interactions and social dynamics, by assessing dating violence, as this is a noted challenge among adult women in the NWT (Government of Northwest Territories, 2019) and is associated with poorer mental health among adolescents (Devries *et al.*, 2013). To assess *symbolic contexts*, referring to social identities that are valued and devalued, we examined gender (Wiens *et al.*, 2017) and sexual orientation (Russell and Fish, 2016) that are associated with increased likelihood of depression in varying contexts. Although these contextual factors have been linked with depression across diverse contexts and populations, there are knowledge gaps regarding how social contextual factors may be associated with depression in adolescents in the NWT, Canada. Such information can inform programs and policy. The study objectives were to assess prevalence and social contextual correlates of depression among adolescents 13–18 years old in the NWT, Canada.

Methods

This study is part of a community-based research project with the Indigenous sexual health program Fostering Open eXpression among Youth (FOXY), developed for Northern and Indigenous girls and young women in the NWT, and Strengths, Masculinities and Sexual Health (SMASH), the counterpart developed for Northern and Indigenous boys and young men in the NWT. Aligned with community-based research principles (Israel *et al.*, 2003; Flicker *et al.*, 2015), the study was designed with Indigenous community partners in the NWT to address local youth needs and priorities, Indigenous community partners co-led the study and are included as co-authors, the community advisory board for FOXY and SMASH includes a majority of members who are Indigenous and from the NWT, Elders contributed to the study design, community collaborators contributed to the interpretation of findings and writing of this manuscript, and the community partner FOXY owns the data and leverages study findings to inform program development and acquire program funding. This was also a collaboration with the Canadian Aboriginal AIDS Network, a national network that leads a collective response for holistic wellness of Indigenous communities across Canada. Part of the ethics approval process with the Aurora Research Institute in the NWT involves gaining approval from all communities for this study, and schools were invited to participate in FOXY and SMASH and all schools that wished to participate were included.

Sample

This community-based study included a non-random sample of secondary school students from 17 NWT communities [Aklavik (2020 population: $n = 696$), Whati (2020 population: $n = 532$), Fort McPherson (2020 population: $n = 791$), N'Dilo First Nations Community (2020 population: $n = 200$), Lutselk'e (2020 population: $n = 330$), Fort Liard (2020 population: $n = 561$), Fort Simpson (2020 population: $n = 1258$), Yellowknife (2020 population: $n = 21372$), Ulukhaktok (2020 population: $n = 477$), Fort Resolution (2020 population: $n = 549$), Behchoko (2020 population: $n = 1983$), Inuvik (2020 population: $n = 3399$), Tuktoyaktuk (2020 population: $n = 989$), Hay River (2020 population: $n = 3793$), K'at'odeeche First Nation (2020 population: $n = 325$), Fort Smith (2020 population: $n = 2586$), Norman Wells (2020 population: $n = 735$)] in the 2018–2019 academic year. We included 399 persons in this study, representing 11.7% of the total youth in the NWT in this age group (GNWT, 2021). Out of 25 communities with junior and secondary schools in the NWT, 17 communities were purposively selected to participate. Each school selected classrooms between grades 7 and 12 to participate in a sexual health workshop, and students in these classrooms were invited to participate. To identify the schools, FOXY conducted school-based outreach, worked with FOXY and SMASH peer volunteers, and schools also learned about FOXY and SMASH through word-of-mouth. As an Indigenous community-based agency in the NWT, FOXY and SMASH have built long-lasting relationships with schools across the NWT. There are no pan-Indigenous approaches to knowledge paradigms and protocols (Loppie, 2007; Lavallée, 2009), but researchers may have different responsibilities when working with Indigenous communities (Datta, 2018), including facilitating research processes that are appropriate, caring, respectful and leave positive impacts on the community, hence following both cultural and research protocols. Relationality, nurturing relationships with community, is a key approach of FOXY's work,

and this includes building lasting relationships with schools over time and providing schools the agency to select classrooms to participate in workshops. Decolonization of research centers Indigenous ways of being and knowing the world, and may differ from Western approaches to objectivity in research sampling approaches (Simpson, 2014; Datta, 2018).

Inclusion criteria were ages 13 and older, attending classes in grades 7–12, able to provide informed consent and agreement to attend a sexual health workshop. The informed consent process, detailed elsewhere (Lys *et al.*, 2016), involved multiple steps: (1) FOXY made plans to conduct the workshop at each school, the school selected classrooms to participate and notified students there were voluntary workshops they could take part in; (2) the school sent parents/guardians a reverse consent form at least 1 week prior to the workshop, this approach assumes consent unless parents or guardians complete the form; (3) on the first day of the workshop, students were informed about the workshop and survey and invited to participate, if they were interested, they completed assent forms. Reverse consent processes were undertaken to increase access to sexual health information and healthy relationship information among adolescents who may not have engaged parents, and aligns with research on youth sexual agency and empowerment to make decisions regarding research participation (Flicker and Guta, 2008). Sexual health workshop content and evaluations of these workshops have been described elsewhere (Lys *et al.*, 2016, 2018); briefly workshops aim to improve STI knowledge, empowerment and safer sex-self efficacy, and employ multi-media arts-based methods to explore sexual health, healthy relationships, safer sex negotiation, gender and healthy communication. The current analysis is based on baseline cross-sectional survey results completed prior to workshop participation. Surveys included sociodemographic characteristics and mental health questions. Participants were compensated with a \$25 CAD valued gift (clothing item).

Measures

We assessed depression using the 9-item Patient Health Questionnaire (PHQ-9; Cronbach's $\alpha = 0.88$, range = 0–27) (Kroenke *et al.*, 2001). We followed scoring guidelines to categorize depression outcomes into: minimal to no depression (scores <5), mild depression (scores 5–9) and moderate or severe depression (scores 10 and above). Although the PHQ-2 has been used with this population before in the NWT (Logie *et al.*, 2018a, b), the PHQ-9 is recommended as a depression screener for adolescents as it may have higher validity than the PHQ-2 (Allgaier *et al.*, 2012). We measured resilience using the Child and Youth Resilience Measure (Liebenberg *et al.*, 2012), an 11-item scale to assess individual, relational, communal and cultural resources (Cronbach's $\alpha = 0.89$, range = 11–55), used in prior research with this population (Logie *et al.*, 2018a, b). We assessed dating violence using the Revised Conflict Tactics Scale (Straus *et al.*, 1996), a 20-item scale addressing psychological aggression, physical assault and sexual coercion that has commonly been used in studies with adolescents (Exner-Cortens *et al.*, 2016). Due to the low frequency of different types of violence exposure (1–15%; with the exception of using a harsh tone of voice, 35%), violence scores were dichotomized based on whether or not participants had experienced any type of violence in intimate relationships.

Participants also reported on their age, gender (cisgender women, cisgender men, transgender and non-binary), sexual identity [lesbian, gay, bisexual, queer, two-spirit or other sexually

diverse (LGBQ2S) or heterosexual], Indigenous identity, living in an urban (Yellowknife) or rural (outside Yellowknife) location. We assessed food insecurity with a single item utilized in prior research with this population (Logie *et al.*, 2019) ('how often do you go to sleep hungry because you do not have enough food to eat', dichotomized to ever *v.* never).

Analyses

Descriptive statistics were calculated to explore sample characteristics and the distribution of outcome variables. To assess whether the prevalence of depression varied across sociodemographic characteristics, we used chi-squared (χ^2) tests for independence with binary outcome indicators and one-way analyses of variance for continuous variables.

All variables that were significantly associated with depression outcomes in bivariate analyses ($p < 0.05$) were then included in ordered logistic regression models to assess factors associated with the outcome of no, mild or moderate/severe depression. Results are reported as odds ratios, with corresponding marginal probabilities. Marginal probabilities were calculated based on the entire sample for all variables except for dating violence. Probabilities were calculated for the average participant: a 14-year-old Indigenous, heterosexual, food-secure cisgender young woman living in a rural region. Since only two-thirds had any dating experience, models including dating violence were run separately. To better understand correlates of mild depression, we also conducted binary logistic regression models with mild *v.* no depression as the outcome. Due to low rates of missing data, all analyses were conducted using list-wise deletion in Stata version 15 (StataCorp., 2017).

Ethics approval

All procedures were approved by the Research Ethics Board of the University of Toronto (31602) and Aurora Research Institute (16410).

Results

Demographics

This analysis included 397 participants ranging from 13 to 18 years old ($M_{\text{age}} = 14.3$, $s.d. = 1.3$). Approximately half (47%, $n = 186$) of the sample reported minimal to no depression symptoms, whereas 25% ($n = 100$) reported mild depression symptoms and 28% ($n = 111$) reported moderate or severe depression symptoms; there was no missing data for this outcome. Sample characteristics are provided in Table 1.

Factors associated with depression

Descriptive analyses revealed that, with the exception of living in an urban or rural region and resilience, all factors tested were associated with depression. On average, participants who identified as cisgender women, Indigenous, LGBQ2S, food insecure, having experienced dating violence and older were over-represented in the higher severity depression categories (see Table 2). Each of these factors was independently associated with increased odds of moderate/severe depression, compared to mild, minimal or none (see Table 3).

In multivariate analyses, only some of these factors were significant. All else being equal, the odds of a more severe type of

Table 1 Participant social and demographic characteristics

	<i>N</i> (%) or mean (s.d.)	Missing
Age	14.3 (1.3)	0
Gender		
Cisgender women	198 (50%)	0
Cisgender men	191 (48%)	
Transgender or other gender category	8 (2%)	
Ethnicity		
Indigenous	312 (79%)	1
Non-Indigenous	84 (21%)	
Urbanicity		
Urban (Yellowknife)	66 (17%)	4
Rural (Other place in NWT)	327 (83%)	
Sexuality		
Sexually diverse (LGBQ2S)	58 (15%)	1
Heterosexual	338 (85%)	
Food security		
Food insecure	179 (45%)	3
Food secure	215 (55%)	
Dating violence		
Experienced violence	125 (51%)	154
No violence	118 (49%)	
Resilience score	39.6 (9.5)	6

depression were approximately double for: cisgender young women compared to other genders (cisgender young men, transgender or non-binary youth); LGBQ2S compared to heterosexual participants; food insecure compared to food secure participants (Table 3). Among those in dating relationships, reporting dating violence was associated with more than double the odds of moderate/severe depression, rather than mild, minimal or none (Table 3).

Notably, only certain factors were associated with increased mild depression relative to minimal or no depression (Table 3). Holding all else equal, the likelihood of experiencing mild depression was higher for cisgender young women than cisgender young men, and more than double (2.44-fold higher) for food insecure individuals compared to food secure counterparts. Considering only participants with dating experience, being a cisgender young woman was the only factor associated with mild depression. That is, all else being equal cisgender young women had 2.5 greater odds of experiencing mild depression than cisgender young men.

Discussion

Findings reveal moderate to severe depression symptoms among 28% of this sample of adolescents in 17 NWT communities. These findings signal that addressing depression among NWT adolescents is important to advance wellbeing, and that there are intervenable social contextual factors in the environment that may contribute to improved mental health (Erskine *et al.*, 2015; Ross *et al.*, 2020). We address knowledge gaps regarding multi-level factors that increase vulnerability to depression

Table 2 Analysis of social and demographic factors across participant depression score categories

	Depression category			χ^2/F	p value
	Minimal/none	Mild	Moderate/severe		
Distribution of social and demographic indicators by depression category ^a					
Binary variables					
Cisgender women (v. cisgender men and other genders)	67 (36%)	52 (52%)	79 (71%)	34.60	<0.0001
Indigenous (v. non-Indigenous)	135 (73%)	77 (77%)	100 (90%)	12.42	0.002
Urban (v. non-urban)	35 (19%)	19 (19%)	12 (11%)	3.79	0.15
LGBQ2S (v. heterosexual)	21 (11%)	10 (10%)	27 (24%)	11.63	0.003
Food insecure (v. food secure)	56 (31%)	54 (54%)	69 (62%)	31.73	<0.0001
Dating violence (v. no violence)	47 (41%)	30 (52%)	48 (69%)	13.37	0.001
Continuous variables					
Age	14.24 (1.23)	13.99 (1.07)	14.62 (1.40)	7.00	0.001
Resilience	39.12 (10.97)	41.41 (7.59)	38.65 (8.14)	2.60	0.08
Marginal probabilities and 95% confidence interval by depression category					
Gender					
Women (cisgender)	0.45 (0.35–0.54)	0.29 (0.24–0.34)	0.27 (0.19–0.34)		
Men/transgender/other gender	0.65 (0.57–0.73)	0.21 (0.16–0.26)	0.14 (0.09–0.18)		
Age					
13-year old	0.46 (0.35–0.57)	0.28 (0.23–0.34)	0.25 (0.17–0.34)		
16-year old	0.41 (0.30–0.52)	0.29 (0.24–0.34)	0.29 (0.20–0.39)		
Ethnicity					
Indigenous	0.45 (0.35–0.54)	0.29 (0.24–0.34)	0.27 (0.19–0.34)		
Non-Indigenous	0.57 (0.43–0.70)	0.25 (0.18–0.32)	0.18 (0.10–0.27)		
Sexuality					
LGBQ2S	0.27 (0.15–0.40)	0.29 (0.23–0.35)	0.44 (0.28–0.59)		
Heterosexual	0.45 (0.35–0.54)	0.29 (0.24–0.34)	0.27 (0.19–0.34)		
Food Security					
Insecure	0.27 (0.20–0.34)	0.29 (0.24–0.34)	0.44 (0.36–0.53)		
Secure	0.45 (0.35–0.54)	0.29 (0.24–0.34)	0.27 (0.19–0.34)		
Dating Violence					
Yes	0.32 (0.19–0.45)	0.30 (0.23–0.37)	0.38 (0.24–0.52)		
No	0.50 (0.36–0.63)	0.28 (0.21–0.35)	0.23 (0.13–0.33)		

^aResults in these columns are reported as *N* (%) for the number of individuals in that depression category who identify as women, Indigenous, etc. for binary variables or the mean (s.d.) of the outcome in each category for continuous variables.

among Arctic adolescents, including food insecurity, teen dating violence and gender and sexual identity related stressors. Scant research has addressed lesbian, gay, bisexual and transgender (LGBT) health in the Arctic, thus this is a significant contribution (Logie and Lys, 2015; Logie *et al.*, 2019). We also highlight heterogeneity in factors that contribute to moderate–severe depression compared with minor depression, which itself is a risk factor for major depression (Rowe and Rapaport, 2006). The eight countries with approximately 4 million residents in the Arctic region (Larsen and Fondahl, 2015) share histories of colonization of Indigenous peoples, an underrepresentation in research – particularly among adolescents, and insufficient healthcare and transportation infrastructure, rendering findings relevant to other Northern,

remote and Indigenous communities in global health research (Allen *et al.*, 2011, 2014; Trout and Wexler, 2020).

We found strong associations between food insecurity and depression, aligning with the evidence base that food insecurity not only has nutrition-related harms for youth but can also impact mental health (Jones, 2017). For instance, food insecurity produces stress responses due to the uncertainty of acquiring adequate food, feelings of shame and powerlessness, and awareness of socio-economic disparities (Jones, 2017). Food insecurity is a longstanding challenge in Arctic regions, including in Canada, that requires multi-level innovative strategies such as community-based initiatives like the Nunavut Food Security Coalition (Wakegijig *et al.*, 2013), understanding how to increase access

Table 3 Ordered and binary logistic regression models assessing depression categories

	Entire sample		Dating sub-sample			
	Odds ratio	95% CI	Adjusted odds ratio	95% CI	Adjusted odds ratio	95% CI
Ordered logistic regression model assessing depression categories (none/minimal, mild, moderate/severe)						
Age	1.16*	1.00–1.35	1.07	0.91–1.25	1.11	0.91–1.35
Gender (woman)	3.09**	2.11–4.53	2.31**	1.55–3.45	2.86**	1.69–4.86
Indigenous	2.16**	1.35–3.45	1.62	0.98–2.68	1.96	0.94–4.08
LGBQ2S	2.13**	1.25–3.64	2.14**	1.21–3.78	3.25**	1.45–7.27
Food insecure	2.92**	2.00–4.28	2.19**	1.47–3.26	1.65	0.98–2.76
Dating violence	2.41**	1.49–3.91	NA	NA	2.11*	1.25–3.54
Binary logistic models assessing mild depression outcomes v. no or minimal depression						
Age	0.83	0.67–1.03	0.80	0.63–1.01	0.83	0.63–1.10
Gender (woman)	1.92*	1.17–3.15	1.71*	1.01–2.88	2.56**	1.29–5.08
Indigenous	1.24	0.70–2.19	1.07	0.58–1.97	1.25	0.53–2.97
LGBQ2S	0.88	0.40–1.96	0.76	0.33–1.79	0.71	0.20–2.51
Food insecure	2.66**	1.61–4.40	2.44**	1.45–4.12	1.58	0.81–3.10
Dating violence	1.55	0.82–2.93	NA	NA	1.71	0.87–3.36

* $p < 0.05$, ** $p < 0.01$

to country (traditional) food (Newell and Doubleday, 2020; Caughey *et al.*, 2021), alongside policy change (Galloway, 2017).

Similar to prior research, we found higher depression prevalence among young women than young men (Wiens *et al.*, 2017); this may be due to girls' increased exposure to violence, pressure to conform to gender norms that intensifies in adolescence and inhibits opportunities and choices, and gender differences in coping strategies and biologic stress responses (Nolen-Hoeksema and Girgus, 1994; Hyde and Mezulis, 2020). Our finding that adolescent violent victimization was associated with higher depression is consistent with prior research (Devries *et al.*, 2013; Johnson *et al.*, 2014) and signals the importance of understanding the root causes of this violence and preventing it to avoid poor social, educational and health outcomes (Miller *et al.*, 2018). As mentioned earlier, the prevalence of interpersonal violence among women in the NWT is 10-fold than the national rate (Government of Northwest Territories, 2019). Teen dating violence prevention in the NWT can build partnerships with youth, Northern and Indigenous organizations, and academics and leverage cultural and community resources and strengths (Morris, 2016). Such programs can also address social contexts of isolation and poverty that exacerbate violence in the NWT (Faller *et al.*, 2018), and apply a gender transformative approach to explore and shift gender and power imbalances among adolescents (Gibbs *et al.*, 2015a; Kågesten and Chandra-Mouli, 2020).

Our finding that sexual minority youth have higher depression prevalence than heterosexual youth corroborates prior research on sexual stigma as a mental health stressor that is amplified by peer regulation of sexuality and gender norms in adolescence (Russell and Fish, 2016), and this social isolation and stigma may be exacerbated in small and rural contexts in the NWT (Logie *et al.*, 2019). Conceptualizing sexual identity within *symbolic contexts* of stigma and discrimination that produce stress and subsequent health disparities aligns with the movement to de-pathologize LGBT people by identifying (and ultimately addressing) the

root causes of social and health disparities in the social environment, such as in social ecological models (Baral *et al.*, 2013), social determinants of health approaches (Logie, 2012), the minority stress model (Chakrapani *et al.*, 2017) and structural approaches to stigma (Parker and Aggleton, 2003). Further research on global mental health can explore social contextual stressors and adaptive coping strategies among LGBT youth in rural, remote and Arctic regions.

Differences in depression between Indigenous and non-Indigenous participants became non-significant in multivariable analyses, pointing to the role of structural and social factors in shaping health. This finding could also be considered positive news in light of prior research that highlights the higher prevalence of severe mental health issues among Indigenous peoples in the circumpolar region (Fraser *et al.*, 2015) – including the NWT (Government of Northwest Territories, 2014; Government of Northwest Territories, 2019) – compared with non-Indigenous counterparts. This may be due to cultural protective factors or systemic differences in the NWT. For instance, there has been a concerted effort to map mental health services in the NWT within a First Nations Mental Wellness Continuum that includes: *Culture as Foundation*, including land and culturally based programs; *Partners in Implementation*, engaging Indigenous communities to increase on the land programming and traditional healing programs and *Indigenous Social Determinants of Health*, which includes factors such as language, culture, land, employment and environmental stewardship (Elman *et al.*, 2019). Arts and land-based programming for youth in the NWT may have positive mental health impacts (Ballantyne, 2014; Fanian *et al.*, 2015; Lys, 2018). This aligns with the earlier discussion of Indigenous youth resilience nurtured by land, community, family and cultural connectedness (Allen *et al.*, 2014; Gray *et al.*, 2016; Hatala *et al.*, 2020). Protective factors for depression among Indigenous adolescents in the Arctic are an area with limited empirical evidence that warrants further investigation.

Our study has limitations. The cross-sectional design and non-probability sampling reduce generalizability of findings to all youth in the NWT. Although this depression prevalence we noted in participants is higher than the national studies of the prevalence of major depressive episodes reported among 12–19 year-olds (pooled prevalence of 5.5%), including in the territories (5.7%) (Yukon, NWT and Nunavut) (Wiens *et al.*, 2017), findings are not directly comparable as national estimates were drawn from the randomized Canadian Community Health Survey (CCHS). CCHS also did not differentiate between mild, moderate or severe depression, which makes the minor depression results difficult to compare. The high depression prevalence in this study may be related, in part, to the non-random sample and the possible biases associated with it. Our sample included 11.7% of the 13–18 year olds in the NWT (GNWT, 2021). Compared with the general population in the NWT, our sample: had a greater proportion of Indigenous participants (79% *v.* 51%); was more likely to live outside of Yellowknife (83% *v.* 49%) and had a similar gender breakdown (50% cisgender women, 48% cisgender men and 2% transgender persons *v.* 51% male and 49% female [we assessed gender and NWT statistics report sex]) (GNWT, 2021). Additionally we used a single-item measure of food insecurity which could be strengthened by more comprehensive measures (Coates *et al.*, 2007). We did not assess peer support, which was linked with reduced depression in prior studies with adolescent girls in the NWT and could be a protective factor (Logie *et al.*, 2018a, b). Future research can test other adolescent-specific violence measures (Exner-Cortens *et al.*, 2016), including attitudes toward adolescent dating violence (Exner-Cortens *et al.*, 2016). Exploring crowded housing in the NWT among adolescents and linkages to depression is another area for future research, as this was a significant risk factor in other Arctic regions (Riva *et al.*, 2014).

Despite these limitations, our study can inform interventions for NWT adolescents that consider *material* (food insecurity), *relational* (dating violence) and *symbolic* (gender and sexual orientation norms) contexts (Campbell and Cornish, 2012). This contextual framing can include youth generated strategies to increase agency and reduce stress, in turn creating health-enabling environments. This information can contribute to the larger program of global mental health research in the Arctic (Trout and Wexler, 2020). For instance, our findings can inform innovative approaches to exploring Arctic youth wellbeing across contexts, such as the Circumpolar Indigenous Pathways to Adulthood (CIPA) study that explored life history narratives of youth from Northeastern Siberian Eveny, Northern Norwegian Sami, Northeastern Canada Inuit, Northwestern Alaska Inupiat and Southwestern Alaska Yup'ik (Allen *et al.*, 2014). Allen *et al.* (2014) describe the salience of exploring youth resilience across circumpolar regions:

The narratives of youth coming of age in circumpolar communities hold potential to also tell a still-evolving story of cultural continuity wrested from disruptive colonial legacies. Youth experience can provide a lens through which to explore ways certain resilience processes might remain deeply patterned within traditional cultural practices, alongside with new emergent strategies representing innovations. (p. 602)

A syndemics approach could also be applied to explore synergies between social inequities (food insecurity, inequitable gender and sexual orientation norms) and health inequities (depression) (Singer *et al.*, 2017). Such approaches hold the potential to

produce multiple social and health benefits, for instance, increasing food security (Jones, 2017), transforming gender norms (Gibbs *et al.*, 2015b) and reducing LGBTQ2S stigma (Logie *et al.*, 2019) could improve life opportunities and equity for NWT adolescents while also reducing depression. Urgent attention is needed to address depression and its contextual correlates with NWT adolescents. It is imperative to understand and attend to the ongoing and long-term impacts of COVID-19 on Arctic youth mental health, particularly among youth with pre-existing mental health challenges that may be sustained or exacerbated by pandemic related anxiety, social isolation and school closures (Council, 2020; The Lancet Infectious Diseases, 2020; The Lancet Psychiatry, 2020; Gadermann *et al.*, 2021).

Acknowledgements. We would like to acknowledge all of the FOXY and SMASH peer leaders and staff, alongside participating schools in the NWT, Aurora Research Institute, and all of the participants. We would also like to thank the anonymous reviewers.

Financial support. We would like to acknowledge funding from the Canadian Institutes of Health Research (CIHR) and Social Sciences & Humanities Research Council of Canada (SSHRC). CHL also receives funding support from the Canada Research Chairs Program, Canada Foundation for Innovation and Ontario Ministry of Research and Innovation.

Conflict of interest. None.

Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. We received research ethics approval from the University of Toronto and Aurora Research Institute.

References

- Allen J, Levintova M and Mohatt G (2011) Suicide and alcohol-related disorders in the U.S. Arctic: boosting research to address a primary determinant of health disparities. *International Journal of Circumpolar Health* 70, 473–487. doi: 10.3402/ijch.v70i5.17847.
- Allen J, Hopper K, Wexler L, Kral M, Rasmus S and Nystad K (2014) Mapping resilience pathways of Indigenous youth in five circumpolar communities. *Transcultural Psychiatry* 51, 601–631. doi: 10.1177/1363461513497232.
- Allgaier AK, Pietsch K, Frühe B, Sigl-Glückner J and Schulte-Körne G (2012) Screening for depression in adolescents: validity of the patient health questionnaire in pediatric care. *Depression and Anxiety* 29, 906–913. doi: 10.1002/da.21971.
- Ballantyne EF (2014) Dechinta Bush university: mobilizing a knowledge economy of reciprocity, resurgence and decolonization. *Decolonization: Indigeneity, Education & Society* 3, 67–85. Available at <https://jps.library.utoronto.ca/index.php/des/article/view/22238>.
- Baral S, Logie CH, Grosso A, Wirtz AL and Beyrer C (2013) Modified social ecological model: a tool to guide the assessment of the risks and risk contexts of HIV epidemics. *BMC Public Health* 13, 482.
- Bellamy S and Hardy C (2015) Understanding depression in Aboriginal communities and families. Prince George, BC: National Collaborating Centre for Aboriginal Health.
- Beydoun H, Beydoun M, Kaufman J, Lo B and Zonderman A (2012) Intimate partner violence against adult women and its association with major depressive disorder, depressive symptoms and postpartum depression: A systematic review and meta-analysis. *Social Science & Medicine* 75, 959–975. doi:10.1016/j.socscimed.2012.04.025.
- Bjerregaard P (2001) Rapid socio-cultural change and health in the Arctic. *International Journal of Circumpolar Health* 60, 102–111.
- Bradette-Laplante M, Courtemanche Y, Desrochers-Couture M, Forget-Dubois N, Bélanger RE, Ayotte P, Jacobson JL, Jacobson SW

- and Muckle G (2020) Food insecurity and psychological distress in Inuit adolescents of Nunavik. *Public Health Nutrition* **23**, 2615–2625.
- Campbell C and Cornish F (2012) How can community health programmes build enabling environments for transformative communication? Experiences from India and South Africa. *AIDS and Behavior* **16**, 847–857.
- Campbell C, Scott K, Nhamo M, Nyamukapa C, Madanhire C, Skovdal M, Sherr L and Gregson S (2013) Social capital and HIV competent communities: the role of community groups in managing HIV/AIDS in rural Zimbabwe. *AIDS Care* **25**(suppl.1), S114–S122.
- Caughey AB, Sargeant JM, Moller H and Harper SL (2021) Inuit country food and health during pregnancy and early childhood in the circumpolar north: a scoping review. *International Journal of Environmental Research and Public Health* **18**, 2625. doi: 10.3390/ijerph18052625.
- Chakrapani V, Vijin PP, Logie CH, Newman PA, Shunmugam M, Sivasubramanian M and Samuel M (2017) Understanding how sexual and gender minority stigmas influence depression among trans women and men who have sex with men in India. *LGBT Health* **4**, 217–226.
- Chartrand V (2019) Unsettled times: Indigenous incarceration and the links between colonialism and the penitentiary in Canada. *Canadian Journal of Criminology and Criminal Justice* **61**, 67–89. doi: 10.3138/cjccj.2018-0029.
- Chenhall R and Senior K (2009) “Those young people all crankybella”: Indigenous youth mental health and globalization. *International Journal of Mental Health* **38**, 28–43. doi:10.2753/IMH0020-7411380302.
- Coates J, Swindale A and Bilinsky P (2007). Household Food Insecurity Access Scale (HFAS) for Measurement of Food Access: Indicator Guide. *Food and Nutrition Technical Assistance Project*. Washington, DC: FANTA & FHI 360. Available at http://www.fao.org/fileadmin/user_upload/eufao-fsi4dm/doc-training/hfias.pdf.
- Collins PY, Delgado AR, Pringle BA, Roca C and Phillips A (2017) Suicide prevention in Arctic Indigenous communities. *The Lancet Psychiatry* **4**, 92–94. doi: 10.1016/S2215-0366(16)30349-2.
- Council TA (2020) The coronavirus in the arctic: Spotlight on mental health. In The Arctic Council.
- Datta R (2018) Decolonizing both researcher and research and its effectiveness in Indigenous research. *Research Ethics* **14**, 1–24.
- De Bellis MD (2001) Developmental traumatology: the psychobiological development of maltreated children and its implications for research, treatment, and policy. *Development and Psychopathology* **13**, 539–564.
- Devries KM, Mak JY, Bacchus LJ, Child JC, Falder G, Petzold M, Astbury J and Watts CH (2013) Intimate partner violence and incident depressive symptoms and suicide attempts: a systematic review of longitudinal studies. *PLoS Medicine* **10**, e1001439. doi: 10.1371/journal.pmed.1001439.
- Elman A, Etter M, Fairman K and Chatwood S (2019) Mental health services in the northwest territories: a scoping review. *International Journal of Circumpolar Health* **78**, 1. doi: 10.1080/22423982.2019.1629783.
- Erskine HE, Moffitt TE, Copeland WE, Costello EJ, Ferrari AJ, Patton G, Degenhardt L, Vos T, Whiteford HA and Scott JG (2015) A heavy burden on young minds: the global burden of mental and substance use disorders in children and youth. *Psychological Medicine* **45**, 1561–1563.
- Exner-Cortens D, Gill L and Eckenrode J (2016) Measurement of adolescent dating violence: a comprehensive review (part 2, attitudes). *Aggression and Violent Behavior* **27**, 93–106. doi: 10.1016/j.avb.2016.02.011.
- Faller YN, Wuerch MA, Hampton MR, Barton S, Fraehlich C, Juschka D, Milford K, Moffitt P, Ursel J and Zederayko A (2018) A web of disheartenment with hope on the horizon: intimate partner violence in rural and northern communities. *Journal of Interpersonal Violence*, **36**, 4058–4083. doi: 10.1177/0886260518789141.
- Fanian S, Young SK, Mantla M, Daniels A and Chatwood S (2015) Evaluation of the Ko'ts'iihtla ('We light the fire') project: building resiliency and connections through strengths-based creative arts programming for Indigenous youth. *International Journal of Circumpolar Health (Online)* **74**, 1. doi: <http://dx.doi.org/10.3402/ijch.v74.27672>.
- Flicker S and Guta A (2008) Ethical approaches to adolescent participation in sexual health research. *Journal of Adolescent Health* **42**, 3–10. doi: 10.1016/j.jadohealth.2007.07.017.
- Flicker S, O'Campo P, Monchalin R, Thistle J, Worthington C, Masching R, Guta A, Pooyak S, Whitebird W and Thomas C (2015) Research done in 'A good way': the importance of Indigenous elder involvement in HIV community-based research. *American Journal of Public Health* **105**, 1149–1154. doi: 10.2105/AJPH.2014.302522.
- Fraser SL, Geoffroy D, Chachamovich E and Kirmayer LJ (2015) Changing rates of suicide ideation and attempts among Inuit youth: a gender-based analysis of risk and protective factors. *Suicide and Life-Threatening Behavior* **45**, 141–156. doi: 10.1111/sltb.12122.
- Freire P (1972) *Pedagogy of the Oppressed*. New York: Penguin.
- Gadermann AC, Thomson KC, Richardson CG, Gagné M, Mcauliffe C, Hirani S and Jenkins E (2021) Examining the impacts of the COVID-19 pandemic on family mental health in Canada: findings from a national cross-sectional study. *BMJ Open* **11**, e042871. doi: 10.1136/bmjopen-2020-042871.
- Galloway T (2017) Canada's northern food subsidy nutrition north Canada: a comprehensive program evaluation. *International Journal of Circumpolar Health* **76**, 1279451. doi: 10.1080/22423982.2017.1279451.
- Gibbs A, Sikweyiya Y and Jewkes R (2015a) “Men value their dignity”: securing respect and identity construction in urban informal settlements in South Africa. *Global Health Action* **7**, 23676. doi: 10.3402/gha.v7.23676.
- Gibbs A, Vaughan C and Aggleton P (2015b) Beyond ‘working with men and boys’: (re)defining, challenging and transforming masculinities in sexuality and health programmes and policy. *Culture, Health and Sexuality* **17** (suppl.2), 85–95.
- Gibbs A, Jewkes R and Sikweyiya Y (2018) “I tried to resist and avoid bad friends”: the role of social contexts in shaping the transformation of masculinities in a gender transformative and livelihood strengthening intervention in South Africa. *Men and Masculinities* **21**, 501–520.
- GNWT (2021) NWT Bureau of Statistics. Available at <http://www.statsnwt.ca/TraditionalActivities/>.
- Government of Northwest Territories (2014) Self-perceived mental health in the Northwest Territories. Yellowknife, Canada: Government of Northwest Territories Health and Social Services. Available at <https://www.hss.gov.nt.ca/sites/hss/files/resources/self-perceived-mental-health.pdf>.
- Government of Northwest Territories (2016a) Population of the Northwest Territories. Yellowknife, Canada: Government of Northwest Territories Health and Social Services. Available at <https://www.hss.gov.nt.ca/sites/hss/files/resources/nwt-population.pdf>.
- Government of Northwest Territories (2016b) Mind and spirit: Promoting mental health and addictions recovery in the Northwest Territories. Yellowknife, Canada: Government of Northwest Territories Health and Social Services. Available at https://www.ntassembly.ca/sites/assembly/files/td_222-182.pdf.
- Government of Northwest Territories (2019) NWT health status chartbook: Transition and strategic planning. Yellowknife, Canada: Government of Northwest Territories Health and Social Services. Available at <https://www.hss.gov.nt.ca/sites/hss/files/resources/health-status-chartbook.pdf>.
- Gray AP, Richer F and Harper S (2016) Individual- and community-level determinants of Inuit youth mental wellness. *Canadian Journal of Public Health* **107**, e251–e257.
- Hatala AR, Njeze C, Morton D, Pearl T and Bird-Naytowhow K (2020) Land and nature as sources of health and resilience among Indigenous youth in an urban Canadian context: a photovoice exploration. *BMC Public Health* **20**, 538. doi: 10.1186/s12889-020-08647-z.
- Hyde JS and Mezulis AH (2020) Gender differences in depression: Biological, affective, cognitive, and sociocultural factors. *Harvard Review of Psychiatry* **28**, 4–13. doi:10.1097/HRP.0000000000000230
- Israel BA, Schulz AJ, Parker EA, Becker AB, Allen AJ and Guzman JR (2003) Critical Issues in Developing and Following Community Based Participatory Research Principles. In Community-ASED Participatory Research for Health.
- Johnson WL, Giordano PC, Longmore MA and Manning WD (2014) Intimate partner violence and depressive symptoms during adolescence and young adulthood. *Journal of Health and Social Behavior* **55**, 39–55. doi:10.1177/0022146513520430
- Jones AD (2017) Food insecurity and mental health status: a global analysis of 149 countries. *American Journal of Preventive Medicine* **53**, 264–273.
- Kägesten A and Chandra-Mouli V (2020) Gender-transformative programmes: implications for research and action. *The Lancet Global Health* **8**, e159–e160. doi: 10.1016/S2214-109X(19)30528-5.

- Kirmayer L, Dandaneau S, Marshall E, Phillips M and Williamson K (2011) Rethinking resilience from Indigenous perspectives. *Canadian Journal of Psychiatry* **56**, 84–91. doi:10.1177/070674371105600203.
- Kroenke K, Spitzer R and Williams J (2001) The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine* **16**, 606–613. doi:10.1046/j.1525-1497.2001.016009606.x
- Larsen JN and Fondahl G (2015). Arctic Human Development Report: Regional Processes and Global Linkages. In *TemaNord*, Vol. II. Copenhagen, Denmark: Norden.
- Lavallée LF (2009) Practical application of an Indigenous research framework and two qualitative Indigenous research methods: sharing circles and Anishnaabe symbol-based reflection. *International Journal of Qualitative Methods*, **8**, 21–40. Available at <http://journals.sagepub.com/doi/10.1177/160940690900800103>.
- Lehti V, Niemelä S, Hoven C, Mandell D and Sourander A (2009) Mental health, substance use and suicidal behaviour among young indigenous people in the Arctic: A systematic review. *Social Science & Medicine* **69**, 1194–1203. doi: 10.1016/j.socscimed.2009.07.045.
- Liebenberg L, Ungar M and Vijver F (2012) Validation of the child and youth resilience measure-28 (CYRM-28) among Canadian youth. *Research on Social Work Practice* **22**, 219–226. doi:10.1177/1049731511428619.
- Logie C (2012) The case for the World Health Organization's commission on the social determinants of health to address sexual orientation. *American Journal of Public Health* **102**, 1243–1246.
- Logie CH and Lys C (2015) The process of developing a community-based research agenda with lesbian, gay, bisexual, transgender and queer youth in the Northwest Territories, Canada. *International Journal of Circumpolar Health* **74**, 28188.
- Logie CH, Lys C, Okumu M and Leone C (2018a) Pathways between depression, substance use and multiple sex partners among Northern and Indigenous young women in the Northwest Territories, Canada: results from a cross-sectional survey. *Sexually Transmitted Infections* **94**, 604–606.
- Logie C, Lys C, Okumu M and Fujioka J (2018b) Exploring factors associated with condom use self-efficacy and condom use among Northern and Indigenous adolescent peer leaders in Northern Canada. *Vulnerable Children and Youth Studies* **14**, 50–62.
- Logie CH, Lys CL, Dias L, Schott N, Zouboules MR, MacNeill N and Mackay K (2019) 'Automatic assumption of your gender, sexuality and sexual practices is also discrimination': exploring sexual healthcare experiences and recommendations among sexually and gender diverse persons in Arctic Canada. *Health and Social Care in the Community* **27**, 1204–1213.
- Loppie C (2007) Learning from the grandmothers: incorporating Indigenous principles into qualitative research. *Qualitative Health Research* **17**, 276–284.
- Lu W (2019) Adolescent depression: national trends, risk factors, and health-care disparities. *American Journal of Health Behavior* **43**, 181–194. doi: 10.5999/AJHB.43.1.15.
- Lys C (2018) Exploring coping strategies and mental health support systems among female youth in the Northwest Territories using body mapping. *International Journal of Circumpolar Health* **77**, 1466604.
- Lys C, Logie CH, MacNeill N, Loppie C, Dias LV, Masching R and Gesink D (2016) Arts-based HIV and STI prevention intervention with Northern and Indigenous youth in the Northwest Territories: study protocol for a non-randomised cohort pilot study. *BMJ Open* **6**, e012399.
- Lys CL, Logie CH and Okumu M (2018) Pilot testing fostering open eXpression among youth (FOXY), an arts-based HIV/STI prevention approach for adolescent women in the Northwest Territories, Canada. *International Journal of STD & AIDS* **29**, 980–986.
- Ma J (2020) The intersection and parallels of aboriginal peoples' and racialized migrants' experiences of colonialism and child welfare in Canada. *International Social Work*. doi: 10.1177/0020872819897757.
- McCalman J, Munford R, Theron L, Sanders J and Bainbridge R (2020) Editorial: resilience approaches to promote the determinants of health for Indigenous and other ethnic community youth. *Frontiers in Public Health*, **8**, 338. doi:10.3389/fpubh.2020.00338
- Men F, Gundersen C, Urquia ML and Tarasuk V (2020) Association between household food insecurity and mortality in Canada: a population-based retrospective cohort study. *Canadian Medical Association Journal* **192**, E53–E60.
- Mendez I, Jong M, Keays-White D and Turner G (2013) The use of remote presence for health care delivery in a northern Inuit community: a feasibility study. *International Journal of Circumpolar Health* **72**, 1. doi: 10.3402/ijch.v72i0.21112.
- Miller E, Jones KA and McCauley HL (2018) Updates on adolescent dating and sexual violence prevention and intervention. *Current Opinion in Pediatrics* **30**, 466–471. doi: 10.1097/MOP.0000000000000637.
- Moffitt P and Fikowski H (2017) Northwest Territories Research Project Report for Territorial Stakeholders: Rural and Northern Community Response to Intimate Partner Violence. Yellowknife, Canada: Faculties of Nursing and Social Work, Aurora Research Institute, Aurora College. Downloaded from: <https://www.mmiwg-ffada.ca/wp-content/uploads/2019/05/NWT-IPV-Frontline-Service-Providers-Final-Report.pdf>.
- Mojtabai R, Olsson M and Han B (2016) National trends in the prevalence and treatment of depression in adolescents and young adults. *Pediatrics* **138**. doi: 10.1542/peds.2016-1878.
- Morris M (2016) Inuit involvement in developing a participatory action research project on youth, violence prevention, and health promotion. *Etudes Inuit Studies* **40**, 105–125. doi: 10.7202/1040147ar.
- Newell SL and Doubleday NC (2020) Sharing country food: connecting health, food security and cultural continuity in Chesterfield Inlet, Nunavut. *Polar Research* **39**, 3755. doi: 10.33265/polar.v39.3755.
- Nolen-Hoeksema S and Girgus JS (1994) The Emergence of Gender Differences in Depression During Adolescence. *Psychological Bulletin* **115**, 424–443. doi:10.1037//0033-2909.115.3.424
- Parker R and Aggleton P (2003) HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action. *Social Science and Medicine* **57**, 13–24.
- Petito A, Pop TL, Namazova-Baranova L, Mestrovic J, Nigri L, Vural M, Sacco M, Giardino I, Ferrara P and Pettoello-Mantovani M (2020) The burden of depression in adolescents and the importance of early recognition. *Journal of Pediatrics* **218**, 265–267.e1.
- Polsky JY and Gilmour H (2020) Food insecurity and mental health during the COVID-19 pandemic. *Health Reports* **31**, 3–11. doi: 10.25318/82-003-x202001200001-eng.
- Pourmotabbed A, Moradi S, Babaei A, Ghavami A, Mohammadi H, Jalili C, Symonds ME and Miraghajani M (2020) Food insecurity and mental health: a systematic review and meta-analysis. *Public Health Nutrition* **23**, 1778–1790. doi: 10.1017/S136898001900435X.
- Pryor L, Lioret S, van der Waerden J, Fombonne É, Falissard B and Melchior M (2016) Food insecurity and mental health problems among a community sample of young adults. *Social Psychiatry and Psychiatric Epidemiology* **51**, 1073–1081. doi: 10.1007/s00127-016-1249-9.
- Razack SH (2016) Sexualized violence and colonialism: reflections on the inquiry into missing and murdered Indigenous women. *Canadian Journal of Women and the Law* **28(2)**, i-iv. doi: 10.3138/cjwl.28.2.i.
- Riva M, Larsen CVL and Bjerregaard P (2014) Household crowding and psychosocial health among Inuit in Greenland. *International Journal of Public Health* **59**, 739–748.
- Ross DA, Hinton R, Melles-Brewer M, Engel D, Zeck W, Fagan L, Herat J, Phaladi G, Imbago-Jácome D, Anyona P, Sanchez A, Damji N, Terki F, Baltag V, Patton G, Silverman A, Fogstad H, Banerjee A and Mohan A (2020) Adolescent well-being: a definition and conceptual framework. *Journal of Adolescent Health* **67(4)**, 472–476. doi: 10.1016/j.jadohealth.2020.06.042.
- Rowe SK and Rapaport MH (2006) Classification and treatment of sub-threshold depression. *Current Opinion in Psychiatry* **19(1)**, 9–13. doi: 10.1097/01.yco.0000194148.26766.ba.
- Russell ST and Fish JN (2016) Mental health in lesbian, gay, bisexual, and transgender (LGBT) youth. *Annual Review of Clinical Psychology* **12**, 465–487.
- Simpson LB (2014) Land as pedagogy: Nishnaabeg intelligence and rebellious transformation. *Decolonization: Indigeneity, Education & Society*, **3**, 1–25. Available at <https://jps.library.utoronto.ca/index.php/des/article/view/22170>.
- Singer M, Bulled N, Ostrach B and Mendenhall E (2017) Syndemics and the biosocial conception of health. *Lancet (London, England)* **389**, 941–950.

- StataCorp** (2017) Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC.
- Statistics Canada** (2020) Household food insecurity, 2017/2018. Ottawa, Canada: Statistics Canada. Available at <https://www150.statcan.gc.ca/n1/pub/82-625-x/2020001/article/00001-eng.htm>.
- Straus M, Hamby S, Boney-McCoy S and Sugarman D** (1996) The revised conflict tactics scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues* **17**, 283–316. doi:10.1177/019251396017003001.
- Subnath M** (2017) Indigenous food insecurity in Canada: An analysis using the 2012 Aboriginal peoples survey. Electronic Thesis and Dissertation Repository. 4459. Available at <https://ir.lib.uwo.ca/etd/4459>
- Tarasuk V, Fafard St-Germain A and Mitchell A** (2019) Geographic and sociodemographic predictors of household food insecurity in Canada, 2011–2012. *BMC Public Health* **19**, 12. doi:10.1186/s12889-018-6344-2.
- Tarasuk V and Mitchell A** (2020) Household food insecurity in Canada, 2017–18. Toronto, Canada: Research to identify policy options to reduce food insecurity (PROOF). Retrieved from <https://proof.utoronto.ca/>.
- The Lancet Infectious Diseases** (2020) The intersection of COVID-19 and mental health. *The Lancet Infectious Diseases* **20**, 1217. doi: 10.1016/S1473-3099(20)30797-0.
- The Lancet Psychiatry** (2020) Mental health and COVID-19: change the conversation. *The Lancet Psychiatry* **7**, 463. doi: 10.1016/S2215-0366(20)30194-2.
- Trout L and Wexler L** (2020) Arctic suicide, social medicine, and the purview of care in global mental health. *Health and Human Rights* **22**, 77–89.
- Ungar M** (2011) The social ecology of resilience: addressing contextual and cultural ambiguity of a nascent construct. *The American Journal of Orthopsychiatry* **81**, 1–17.
- Wakegijig J, Osborne G, Statham S and Issaluk MD** (2013) Collaborating toward improving food security in Nunavut. *International Journal of Circumpolar Health* **72**, 21201. doi: 10.3402/ijch.v72i0.21201.
- Wiens K, Williams JVA, Lavorato DH, Duffy A, Pringsheim TM, Sajobi TT and Patten SB** (2017) Is the prevalence of major depression increasing in the Canadian adolescent population? Assessing trends from 2000 to 2014. *Journal of Affective Disorders* **210**, 22–26.