International Journal of Behavioral Medicine (2019) 26:449–453
https://doi.org/10.1007/s12529-019-09797-0

BRIEF REPORT

# Syndemic Factors Associated with Safer Sex Efficacy Among Northern and Indigenous Adolescents in Arctic Canada

Carmen H. Logie[1,2] · Candice L. Lys[3,4] · Kayley Mackay[3] · Nancy MacNeill[3] · Analaura Pauchulo[1] · Abdool S. Yasseen III[5]

Published online: 19 June 2019


## Abstract

**Background** Syndemic approaches explore the synergistic relationships between social and health inequities. Such approaches are particularly salient for the Northwest Territories, Canada, that experiences national social (food insecurity, intimate partner violence [IPV]) and health (sexually transmitted infections [STI]) disparities. Safer sex efficacy (SSE) includes knowledge, intention, and relationship dynamics that facilitate safer sex negotiation. We examined factors associated with SSE among NWT adolescents.

**Methods** We conducted a cross-sectional survey with a venue-based sample of adolescents aged 13–17 in 17 NWT communities from 2016 to 2017. Summary statistics and statistical comparisons were conducted, followed by crude and adjusted multivariable regression models to assess factors associated with SSE.

**Results** Among participants ($n = 610$; mean age 14.2 years [SD 1.5]; 49.5% cisgender women, 48.9% cisgender men, 1.6% transgender persons; 73.3% Indigenous), one-quarter ($n = 144$; 23.6%) reported food insecurity and nearly one-fifth ($n = 111$; 18.2%) IPV. In adjusted analyses, among young women, food insecurity ($\beta$ − 1.89[CI − 2.98, − 0.80], $p = 0.001$) and IPV ($\beta$ − 1.31[CI − 2.53, − 0.09], $p = 0.036$) were associated with lower SSE, and currently dating was associated with increased SSE ($\beta$ 1.17[CI 0.15, 2.19], $p = 0.024$). Among young men, food insecurity ($\beta$ − 2.27[CI − 3.39, − 1.15], $p = 0.014$) was associated with reduced SSE. Among sexually active participants ($n = 115$), increased SSE was associated with consistent condom use among young women ($\beta$ 1.40[0.19, 2.61], $p = 0.024$) and men ($\beta$ 2.14[0.14, 4.14], $p = 0.036$).

**Conclusions** Food insecurity and IPV were associated with lower SSE—a protective factor associated with consistent condom use—underscoring the need to address poverty and violence to advance adolescent sexual health in the NWT.

**Keywords** Resilience · Indigenous · Youth · HIV and STI prevention · Arctic

## Introduction

High sexually transmitted infections (STI) prevalence is reported in the Arctic [1, 2]. While diverse in cultures and regions, Arctic peoples share experiences of limited health resources, infrastructure, and research [1, 2]. In Canada's Northwest Territories (NWT), STI rates are 7-fold higher than the national average [1, 3]. Chlamydia infections in the NWT increased by 32% from 2003 to 2012 and most (82.6%) were among individuals aged 30 years and under. Similarly, the NWT gonorrhea prevalence was 12 times higher than the national average with the highest proportion of cases among individuals aged 30 years and younger [3]. Indigenous peoples in Canada comprise 51% of NWT's population and experience social and health disparities resulting from ongoing effects of colonization and residential schools, and disconnection from culture, land, and languages [2].

Condom use is an accessible tool for reducing HIV and STI transmission risks and unintended pregnancy among adolescents [4–6]. Safer sex efficacy (SSE) encompasses the ability to negotiate sexual decision-making, use condoms and barriers, and have enjoyable and pleasurable sex [7]. A review

✉ Carmen H. Logie
carmen.logie@utoronto.ca

1 Factor-Inwentash Faculty of Social Work, University of Toronto, 246 Bloor Street West, Toronto, Ontario M5S 1V4, Canada

2 Women's College Research Institute, Women's College Hospital, Toronto, Ontario, Canada

3 Fostering Open eXpression among Youth (FOXY), Yellowknife, Northwest Territories, Canada

4 Aurora Research Institute, Inuvik, Northwest Territories, Canada

5 Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

of 63 studies in sub-Saharan Africa revealed an association between SSE and sexual practices, but with differential effects based on gender and measures used [8]. SSE is underexplored among NWT adolescents [7]. This is particularly important to examine as the NWT experiences higher national rates of intimate partner violence (IPV) [9] and food insecurity [10]. Food insecurity, referring to inadequate and uncertain food access, has reached record levels in the NWT with over one-fifth of the population impacted—more than 2.5-fold the national prevalence [10]. The remote location of NWT communities results in more expensive food prices, and combined with poverty, high unemployment rates, and climate challenges, constrain the ability of families to meet food needs. IPV [9] and food insecurity [11] have been described as social drivers of STI as these factors are associated with lower sexual agency and condom use. Research with youth peer leaders in the NWT found negative associations between food insecurity and condom use self-efficacy [4]. Weiser's conceptual framework [11] details multiple pathways from food insecurity to HIV risk, including mental health pathways whereby food insecurity can result in depression and substance use, which in turn can reduce engagement in safer sex practices.

The convergence of violence, food insecurity, and STI in the NWT suggests a syndemic—synergistic associations between social and health disparities [12]—that requires urgent focus. Prior NWT research with youth applied a syndemics framework to assess social inequities, including food insecurity, associated with condom use self-efficacy [4]. This study aimed to identify factors associated with SSE among adolescents in the NWT, and among sexually active participants, we examined associations between SSE and condom use.

## Methods

### Study design

Working in collaboration with an Indigenous sexual health program, we conducted a cross-sectional survey with Northern and Indigenous adolescents aged 13–17 in 17 NWT communities (Aklavik [$n = 656$], Whatì [$n = 522$], Fort McPherson [$n = 776$], Ndilǫ [$n = 321$], Łutselk'e [$n = 299$], Fort Liard [$n = 658$], Fort Simpson [$n = 1174$], Yellowknife [20,834], Ulukhaktok [$n = 420$], Fort Resolution [$n = 507$], Behchokǫ [$n = 2227$], Inuvik [$n = 3192$], Tuktoyaktuk [$n = 1026$], Hay River [$n = 3734$], Kátł'odeeche First Nation [$n = 329$], Fort Smith $n = 2562$], and Norman Wells [$n = 809$]) between October 2016 and June 2017. These 17 communities (median 28 [IQR 18–37] participants per community) were purposively sampled out of NWT's 25 communities with junior/secondary schools; there was only one school that declined an offer to participate. Each school selected a classroom between grades 7 and 12 to participate in the workshop. The study was approved by the Research Ethics Boards at the University of Toronto and Aurora Research Institute.

### Setting and participants

Participants were recruited using purposive, venue-based sampling at secondary schools participating in a sexual health workshop in 17 NWT communities. Inclusion criteria included youth ages 13–18. The participants provided a written informed voluntary consent prior to completing the self-administered paper-based survey (findings presented are the pre-test surveys completed before attending the sexual health workshop). Each participant provided an informed voluntary written consent to participate prior to completing the survey. Reverse consent forms were also sent to parents/guardians 1 week in advance of the survey; these assume parental or guardian consent unless indicated otherwise.

### Measures

The primary outcome measure, safer sex efficacy, was assessed with Kalichman et al.'s 5-item Safer Sex Negotiation Scale [13] (continuous response scale 1–5: strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) (median [IQR] 22 [20–25]; Cronbach's alpha 0.89). Among persons reporting they were sexually active (defined as any vaginal, anal, or oral sexual acts experience within the past 3 months—measured dichotomously as Yes/No), we assessed past 3-month consistent condom use (condom use always) during vaginal/anal sex (measured dichotomously: Yes/No). Exposure measures included socio-demographics: gender, ethnicity (Indigenous, non-Indigenous), sexual orientation, urban (Yellowknife) vs. rural (outside of Yellowknife) residence. Social variables examined included food insecurity measured dichotomously: participants self-reported each week having gone to bed hungry (sometimes/often/always vs. never) [14] and intimate partner violence. Experiencing psychological and/or physical violence from a partner (i.e., IPV) was assessed using 22 items from the Safe Dates scale [15] (Cronbach's alpha 0.93) measured dichotomously (experienced this form of violence vs. not) ($n = 111$ [18.5%] reported experiencing at least 1 item). Among those that reported experiences of IPV, there was a median [IQR] of 3 [2–6] items experienced.

### Statistical Analysis

Summary statistics were used to compare demographic differences between genders (cisgender women, cisgender men). Transgender/gender diverse individuals were excluded from statistical comparisons due to small sample sizes. We examine the relationship between SSE and demographic/social variables using crude and adjusted regression models. The

primary analysis was stratified by gender and repeated among a subset of sexually active youth. Statistical significance was evaluated using two-sided $p$ values at a 0.05 level of significance, and all data management and analyses were conducted in SAS version 9.4 (Cary, NC 2019).

## Results

### Demographics

Of 610 participants (mean age 14.2 years [SD 1.5]; cisgender men: $n = 302$, 49.5%; cisgender women: $n = 298$, 48.9%; transgender/gender diverse: $n = 10$, 1.6%), nearly three-quarters ($n = 447$; 73.3%) were Indigenous, one-quarter ($n = 144$; 23.6%) reported food insecurity, and nearly one-fifth ($n = 111$; 18.2%) IPV. Table 1 reports gender differences across variables.

As reported in Table 2, in adjusted analyses across participants, SSE was positively associated with currently dating ($\beta$ 1.00; 95%CI 0.19, 1.80) and negatively associated with food insecurity ($\beta$ −2.02; 95%CI −2.79, −1.24) and IPV ($\beta$ −1.23; 95%CI −2.19, −0.26). Among young women, food insecurity ($\beta$ −1.89; 95%CI −2.98, −0.80) and IPV ($\beta$ −1.31; 95%CI −2.53, −0.09) were associated with lower SSE, and currently dating ($\beta$ 1.17; 95%CI 0.15, 2.19) and urban vs. rural residence ($\beta$ 1.52; 95%CI 0.31, 2.72) were associated with increased SSE. Among young men, food insecurity ($\beta$ −2.27; 95%CI −3.39, −1.15) was associated with reduced SSE. No differences in SSE emerged by Indigenous identity across adjusted analyses. Among sexually active participants ($n = 115$), in adjusted analyses, increased SSE was associated with increased condom use across the sample ($\beta$ 1.50; 95%CI 0.50, 2.49), among young women ($\beta$ 1.40; 95%CI 0.19, 2.61) and among young men ($\beta$ 2.14; 95% 0.14, 4.14).

## Discussion

In this sample of Northern and Indigenous adolescents, food insecurity was 3-fold higher than the national average and associated with lower SSE [10]. IPV was reported among nearly one-fifth of participants and was associated with lower SSE among young women. Our findings thus corroborate prior studies that demonstrate the role that social factors, such as food insecurity and IPV, play in shaping sexual risks and sexual agency [11]. Among adolescent girls in this study, urban vs. rural residence and currently dating also emerged as protective factors associated with SSE. This could suggest that dating could build SSE skills, and there may be greater access to sexual health resources in Yellowknife than in rural locations. Yet girls were more likely to report IPV and being sexually active, calling for gender-sensitive interventions that address social contexts of sexual risk.

A recent study with peer leaders in the NWT reported that resilience was associated with SSE [4]; in the present study, resilience was not significantly associated with SSE. This underscores the need to address social factors—namely poverty and violence—that were the most salient factors associated with SSE in this larger sample. Associations between SSE and condom use in this sample also corroborate the utility of assessing SSE as a proxy for sexual risk practices.

Study limitations include social desirability bias that could lead to underreporting sexual practices, IPV, and food insecurity. Using tablet-based survey data collection methods in future studies could reduce confidentiality concerns among this sample. The non-probability sampling of classrooms within the schools, and of schools within the NWT, precludes the

**Table 1** Comparison of demographic characteristics of a sample of adolescents aged 13–17 in the Northwest Territories, Canada, stratified by gender ($n = 610$)

| | Cisgender young women ($n = 302$) | Cisgender young men ($n = 298$) | Transgender/gender fluid youth ($n = 10$) | $p$ value[a] |
|---|---|---|---|---|
| Age in years, at survey (mean, standard deviation) | 14.2 (1.5) | 14.2 (1.4) | 13.7 (1.3) | 0.735 |
| Lesbian, gay, bisexual, or queer (*N*, %) | 62 (20.9) | 17 (5.7) | 6 (66.7) | < 0.001 |
| Indigenous (*N*, %) | 228 (75.5) | 210 (70.5) | 9 (90.0) | 0.166 |
| Urban place of residence (*N*, %) | 220 (72.8) | 206 (69.1) | 7 (70.0) | 0.315 |
| Food insecurity (*N*, %) | 73 (24.3) | 67 (22.8) | 4 (40.0) | 0.674 |
| Currently dating (*N*, %) | 86 (28.5) | 51 (17.3) | 4 (40.0) | 0.001 |
| Ever experienced violence from partner (*N*, %) | 65 (21.5) | 45 (15.1) | 1 (10.0) | 0.042 |
| Sexually active (*N*, %) | 69 (22.8) | 46 (15.4) | 0 (0.0) | 0.021 |
| Safe sex self-efficacy score (mean, standard deviation) | 20.6 (4.1) | 20.2 (3.9) | 21.0 (2.7) | 0.237 |

[a] Statistical comparisons for age and safe sex self-efficacy scores were made using Student's $t$ test, all other comparisons were made using $\chi^2$ tests for homogeneity among cisgender women to men and do not include transgender/gender fluid individuals due to small numbers

**Table 2** Crude and adjusted regression models with factors associated with safer sex efficacy among a sample of adolescents aged 13–17 in the Northwest Territories, Canada, stratified by gender* ($n$ = 600)

| | Crude $\beta$ (95%CI) | | | Adjusted $\beta$ (95%CI) | | |
|---|---|---|---|---|---|---|
| | Overall | Cisgender young women | Cisgender young men | Overall | Cisgender young women | Cisgender young men |
| Resilience | 0.17 (0.07, 0.27) | 0.21 (0.08, 0.34) | 0.09 (− 0.09, 0.27) | 0.07 (− 0.04, 0.17) | 0.09 (− 0.04, 0.22) | 0.03 (− 0.15, 0.22) |
| Cisgender women vs. cisgender men | 0.80 (− 1.81, 3.42) | NA | NA | 0.23 (− 0.45, 0.91) | NA | NA |
| Age at survey | 0.28 (0.06, 0.50) | 0.45 (0.15, 0.75) | 0.06 (− 0.26, 0.39) | 0.06 (− 0.20, 0.31) | − 0.08 (− 0.46, 0.30) | 0.06 (− 0.34, 0.46) |
| Lesbian, gay, bisexual, or queer | − 0.43 (− 1.38, 0.51) | − 0.73 (− 1.93, 0.47) | − 0.88 (− 2.78, 1.02) | − 0.67 (− 1.62, 0.28) | − 0.89 (− 1.99, 0.21) | − 0.55 (− 2.43, 1.33) |
| Indigenous vs. non-Indigenous | 0.29 (− 0.46, 1.03) | 1.45 (0.32, 2.57) | − 0.71 (− 1.71, 0.29) | − 0.03 (− 0.82, 0.76) | 0.93 (− 0.23, 2.09) | − 0.68 (− 1.77, 0.41) |
| Urban place of residence | 0.95 (0.22, 1.68) | 2.37 (1.30, 3.45) | − 0.32 (− 1.32, 0.68) | 0.57 (− 0.25, 1.39) | 1.52 (0.31, 2.72) | − 0.14 (− 1.26, 0.99) |
| Food insecurity | − 2.01 (− 2.77, − 1.25) | − 1.81 (− 2.95, − 0.67) | − 2.32 (− 3.36, − 1.28) | − 2.02 (− 2.79, − 1.24) | − 1.89 (− 2.98, − 0.80) | − 2.27 (− 3.39, − 1.15) |
| Living with an adult | − 0.94 (− 5.45, 3.57) | − 4.41 (− 12.43, 3.60) | 0.69 (− 4.72, 6.09) | 0.05 (− 4.30, 4.40) | − 5.76 (− 14.48, 2.96) | 1.31 (− 3.98, 6.60) |
| Currently dating | 1.10 (0.32, 1.88) | 1.22 (0.16, 2.29) | 0.89 (− 0.33, 2.11) | 1.00 (0.19, 1.80) | 1.17 (0.15, 2.19) | 0.90 (− 0.39, 2.20) |
| Violence from partner | 0.46 (− 0.38, 1.30) | 0.65 (− 0.52, 1.81) | 0.24 (− 1.02, 1.49) | − 1.23 (− 2.19, − 0.26) | − 1.31 (− 2.53, − 0.09) | − 1.18 (− 2.74, 0.37) |

*Statistical comparisons compare cisgender young women with cisgender young men and do not include transgender/gender fluid individuals due to small numbers

ability to extrapolate findings across the NWT and to other Arctic settings. The nested nature of the data could also be a limitation, as communities may have idiosyncrasies not taken into account in the statistical analyses. Future research could assess mental health issues such as depression and examine their association with SSE. The study has strengths even with these limitations, as it is the first to our knowledge to examine SSE among a large sample of gender diverse youth in the NWT or other Arctic regions.

Our study findings support the need to assess for—and reduce—food insecurity and IPV among NWT adolescents. Addressing the syndemic of poverty and violence associated with lower SSE is urgently required in this context with high STI prevalence. Future research and culturally, gender- and age-tailored interventions at intrapersonal, interpersonal, family, and community levels are needed to address these important syndemic factors associated with sexual health, sexual agency, and wellbeing among adolescents in Arctic Canada.

**Acknowledgments** We would like to thank all of the participants, peer research assistants, and collaborators.

**Funding** We recognize funding from the Canadian Institutes of Health Research (CIHR) and the Social Sciences & Humanities Research Council of Canada (SSHRC). Dr. Logie's efforts were also supported by an Ontario Ministry of Research & Innovation Early Researcher Award and the Canada Research Chairs program.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare they have no conflicts of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the University of Toronto and the Aurora Research Institute and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Statement of Informed Consent** Informed consent was obtained from all individual participants included in the study.

## References

1. Northwest Territories Health and Social Services. NWT health and social system annual report 2016–2017. Yellowknife; 2018. https://www.hss.gov.nt.ca/sites/hss/files/resources/hss-annual-report-2016-17.pdf. Accessed 29 Jan 2019.
2. Corosky GJ, Blystad A. Staying healthy "under the sheets": Inuit youth experiences of access to sexual and reproductive health and rights in Arviat, Nunavut, Canada. Int J Circumpolar Health. 2016;75(1):31812. https://doi.org/10.3402/ijch.v75.31812.
3. Public Health Agency of Canada. Report on sexually transmitted infections in Canada 2013–2014. Ottawa; 2017. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/report-sexually-transmitted-infections-canada-2013-14/report-sexually-transmitted-infections-canada-2013-14-eng.pdf. Accessed 29 Jan 2019.

4. Logie CH, Lys C, Okumu M, Fujioka J. Exploring factors associated with condom use self-efficacy and condom use among Northern and Indigenous adolescent peer leaders in Northern Canada. Vulnerable Child Youth Stud.. 2018;14:50–62. https://doi.org/10.1080/17450128.2018.1554277.
5. Addoh O, Sing E, Loprinzi PD. Safe sex self-efficacy and safe sex practice in a Southern United States college. Health Promot Perspect. 2017;7(2):74–9. https://doi.org/10.15171/hpp.2017.14.
6. Wang T, Lurie M, Govindasamy D, Mathews C. The effects of school-based condom availability programs (CAPs) on condom acquisition, use and sexual behaviour: a systematic review. AIDS Behav. 2018;22:308–20. https://doi.org/10.1007/s10461-017-1787-5.
7. Closson K, Dietrich JJ, Lachowsky NJ, Nkala B, Palmer A, Cui Z, et al. Gender, sexual self-efficacy and consistent condom use among adolescents living in the HIV hyper-endemic setting of Soweto, South Africa. AIDS Behav. 2018;22(2):671–80. https://doi.org/10.1080/00224499.2017.1421607.
8. Closson K, Dietrich JJ, Lachowsky NJ, Nkala B, Palmer A, Cui Z, et al. Sexual self-efficacy and gender: a review of condom use and sexual negotiation among young men and women in Sub-Saharan Africa. J Sex Res. 2018;55(4–5):522–39. https://doi.org/10.1080/00224499.2017.1421607.
9. Ibrahim D. Section 2: police-reported family violence in Canada, 2014 - an overview. In: Statistics Canada, ed. Juristat - Family Violence in Canada: A Statistical Profile, 2014. Ottawa; 2016. https://www150.statcan.gc.ca/n1/pub/85-002-x/2016001/article/14303-eng.pdf. Accessed 29 Jan 2019.
10. Northwest Territories Bureau of Statistics. Food security. Yellowknife; 2014. https://www.statsnwt.ca/Poverty%20Indicators/g.%20Food%20Security.xlsx. Accessed 29 Jan 2019.
11. Weiser SD, Young SL, Cohen CR, Kushel MB, Tsai AC, Tien PC, et al. Conceptual framework for understanding the bidirectional links between food insecurity and HIV/AIDS. Am J Clin Nutr. 2011;94:1729S–39S.
12. Singer M, Clair S. Syndemics and public health: reconceptualizing disease in bio-social context. Med Anthropol Q. 2003;17(4):423–41.
13. Kalichman SC, Rompa D, DiFonzo K, Simpson D, Kyomugisha F, Austin J, et al. Initial development of scales to assess self-efficacy for disclosing HIV status and negotiating safer sex in HIV-positive persons. AIDS Behav. 2001;5:291–6.
14. Logie CH, Kenny KS, Lacombe-Duncan A, et al. Factors associated with sexually transmissible infections testing practices among men who have sex with men in Jamaica: results from a cross-sectional, tablet-based survey. Sex Health. 2018;14(4):325–34.
15. Foshee VA, Bauman K, Arriaga XB, et al. An evaluation of safe dates, an adolescent dating violence prevention program. Am J Public Health. 1998;88(1):45–50.