Factors Associated With the Sexual Behavior of Canadian Aboriginal Young People and Their Implications for Health Promotion

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Objectives. We examined factors associated with having ever had sex, having more than 1 lifetime sexual partner, and condom nonuse at last incident of sexual intercourse among Canadian Aboriginal young people.

Methods. We conducted a secondary analysis of data from the 2003 British Columbia Adolescent Health Survey, a cross-sectional survey of young people in grades 7 through 12.

Results. Of 1140 young Aboriginal men, 34% had ever had sex; of these, 63% had had more than 1 sexual partner, and 21% had not used a condom at their last incident of sexual intercourse. Of 1336 young Aboriginal women, 35% had ever had sex; of these, 56% had had more than 1 sexual partner, and 41% had not used a condom at their last incident of sexual intercourse. Frequent substance use, having been sexually abused, and having lived on a land reservation were strongly associated with sexual behavior outcomes. Feeling connected to family was strongly associated with increased condom use.

Conclusions. Sexual behavior change interventions for Aboriginal young people must move beyond the individual and incorporate interpersonal and structural dimensions. Interventions to reduce substance use and sexual abuse and promote feelings of family connectedness in this population should be explored. Young people living on land reserves need special attention. (*Am J Public Health.* 2009;99:855–862. doi:10.2105/AJPH.2007.132597)

There are over 5 million people of indigenous ancestry in Canada and the United States[1,2] and more than 1000 recognized First Nations and Tribal governments.[3,4] Indigenous young people in both countries bear a disproportionate burden of sexually transmitted infections (STIs). For example, in Canada Aboriginal young people aged 15 through 19 years are 7 times more likely to be diagnosed with chlamydia than are non-Aboriginal young people.[5] Aboriginal people of all ages are 7 times more likely to be diagnosed with HIV than the general population.[5] Among American Indians and Alaska Natives aged 15 through 24 years in the United States, incidences of gonorrhea and chlamydia are proportionately higher than they are among any other ethnic/racial group except for African Americans.[6] Adolescent pregnancy is also more common among indigenous than among nonindigenous young women.[7,8]

Changing sexual behavior is an important strategy for preventing STIs and unwanted pregnancy.[9] Behaviors that can reduce the risk of STI and pregnancy include delaying sexual debut, limiting the number of partners, and using condoms; addressing all 3 is important for a comprehensive behavioral approach.[10] Knowing which factors are associated with these behaviors among Aboriginal young people is necessary to design maximally effective prevention programs for this group.

Most studies of factors associated with potentially risky sexual behavior, however, do not focus on indigenous populations. Extant larger studies that focus on indigenous young people have been conducted in the United States. One such study used late 1980s data from selected sites and examined the factors associated with having ever had sex.[11] Another used 1998 and 2001 data from Minnesota American Indian young people and examined factors associated with having ever had sex.[12] A third US study examined condom use and number of sexual partners among young people[13] but was confined to 1 tribal area. In Canada, there has been 1 large study of adults on 11 land reservations in Ontario[14] but no studies of young people. Other studies are small and have produced inconsistent results.[15]

In our study, we examined factors associated with having ever had sex, having had more than 1 sexual partner, and not having used a condom at last incident of sexual intercourse among Canadian Aboriginal young people. We included factors known to be important predictors of sexual behavior in other populations as well as variables unique to indigenous young people. We sought to determine which factors were the strongest predictors of sexual behavior.

We selected factors according to an ecological perspective[16] that outlines different levels of influence on health outcomes. Our model included a structural level, consisting of variables related to the broader social environment; an interpersonal level, where influences come from the community, school, and family; an individual level, to allow for life history and individual behaviors; and a situational level, which includes factors occurring at the time of a sexual encounter.

The structural and historical context is especially important to consider in relation to current health outcomes for Aboriginal young people.[17] The destruction of traditional ways of life and social reorganization resulting from colonization as well as the abuse and trauma suffered by residential or boarding school attendees have profoundly influenced indigenous communities.[17] We considered 2 variables related to the broader social context: living on-reserve and cultural traditions. Living on-reserve is associated with low income levels and high risk of some diseases[18,19]; we hypothesized it would be positively associated with our behavioral outcomes. Qualitative work has shown that some Aboriginal young people perceive pregnancy and fertility as traditionally valued in their communities and that some young people desire pregnancy in the context of serious relationships.[20] We

hypothesized that, compared with those with less cultural knowledge, young people who had more cultural knowledge would be less likely to have ever had sex and to have a lower number of partners, but also less likely to have higher levels of condom nonuse.

At the interpersonal level, volunteering is associated with lack of sexual experience among American Indian adolescents[12] and with safer sexual behavior among other populations[21–23]; hence, we hypothesized that helping in the community would be negatively associated with our outcomes.

Feelings of connection to family and school may both provide an effective buffer to stressful life events and encourage higher educational aspirations, which are both associated with lower STI and pregnancy risk.[24–26] Some research has demonstrated that poor parent–adolescent communication and a lack of parental supervision are associated with potentially risky sexual behavior outcomes in diverse groups.[27–29] We hypothesized that increased family and school connectedness would be negatively associated with our behavioral outcomes. Similarly, peer attitudes can be an important predictor of young people's behavior because of social identity development during adolescence.[30] We hypothesized that, similar to nonindigenous young people, negative peer perceptions of pregnancy would be negatively associated with our outcomes.[30]

Individual history of sexual abuse has a clear association with subsequent sexual risk in the general population[31–35] and among American Indian adolescents.[12,36] The causal mechanism for the effects of abuse on behavior remains unclear but may involve negative mental health sequelae,[37] diminished self-efficacy and sexual negotiation skills, and an increased desire to conceive because of fertility concerns.[38] We hypothesized that experience of sexual abuse would be positively associated with our behavioral outcomes.

Research has produced conflicting results on the relation between the use of various substances and sexual health outcomes. Alcohol and marijuana use have been associated with sexual behaviors in various populations, although evidence on causality is equivocal.[39–41] In this study, we hypothesized that substance use both over the lifetime and during a sexual encounter would be positively associated with our outcomes. We also considered use of contraception methods other than condoms at a particular sexual encounter as a risk factor for condom nonuse because pregnancy prevention is the primary goal of condom use for many adolescents.[42]

We tested our hypotheses using a data set representative of young people attending grades 7 through 12 in British Columbia, Canada.

METHODS

We performed secondary analyses with data from the 2003 British Columbia Adolescent Health Survey (BCAHS 2003). The BCAHS is a cross-sectional survey administered every 5 to 6 years to young people enrolled in grades 7 through 12 in the province of British Columbia. Full details of the sampling scheme are available elsewhere.[43] Briefly, the province is stratified by the administrative areas of the British Columbia Ministry of Health and then by grade. A random sample of classrooms is invited to participate in each stratum. Permission for each classroom to participate is granted from school districts, which are the administrative units of the British Columbia Ministry of Education and fit within the administrative areas of the Ministry of Health. For the 2003 cycle, 45 of 59 school districts in British Columbia participated, involving 40 040 eligible students in 1557 classrooms. Informed consent was sought either from parents (with student assent) or students (with parental notification) depending on school district requirements. Selected participants returned 30 884 questionnaires, yielding an overall response rate of 76% among students in participating districts. The main reason for nonresponse was absenteeism on the day of the survey (12%).

Ethical Consultation and Approval

No formal community ethical review was available, so we held initial discussions with Aboriginal community health promotion workers to ensure analyses would be conducted in an ethical and sensitive way. All agreed that the information would be useful for program development, which we took as community approval for the project.

Participants

Only participants who identified themselves as Aboriginal were included in the analyses. Participants were considered Aboriginal if they selected "Aboriginal/First Nations" in response to the question, "What is your background?"; if they specified a particular First Nation or other Aboriginal group in the "Other: please specify" category; or if they answered yes to the question, "Are you Aboriginal/First Nations?" Having ever had sex was defined as a positive response to the question, "Have you ever had sex?" and not indicating elsewhere in the survey that they had never had sex. Only those who had ever had sex were included in the condom use and partner analyses.

Measures

The sexual behavior outcomes were measured using binary variables and consisted of the following: ever having sexual intercourse (vs never), having more than 1 lifetime sexual partner (vs only 1), and not having used a condom at last incident of sexual intercourse (vs using a condom). Exposure measures are described in Table 1. We examined 12 exposure variables in relation to having ever had sex, 13 for having more than 1 sexual partner, and 14 for condom use at last incident of sexual intercourse (Table 3). We hypothesized age in years a priori to be a confounder and included it in all multivariate models. We computed individual scores for family and school connectedness by summing item scores and dividing by the number of items completed. Cronbach α in the sample used here for family connectedness was 0.86 (both genders) and for school connectedness was 0.80 among young men and 0.81 among young women. Because there is no universally accepted definition of problematic substance use levels, we generated a score by computing mean frequency of lifetime substance use for each participant. We computed the median of individual scores and classified all Aboriginal young people as above ("high") or below ("low") the median.

Statistical Analyses

The BCAHS 2003 provides weights to correct for the differing probability of selection

TABLE 1—Measurement of Exposures: Aboriginal Adolescent Health Survey, British Columbia, 2003

Factor	Variable	Measurement
Age	What is your age in years?	Continuous
Cultural knowledge	How much have you learned about culture from your family?	Some or a lot/none
	How much have you learned about culture from your school?	Some or a lot/none
	How much have you learned about culture from your community?	Some or a lot/none
Reserve	Have you ever lived on a reserve?	Ever/never
Community involvement	In the past 12 months, did you help others without pay by helping in your community?	Yes/no
	In the past 12 months, did you help others without pay by helping neighbors or relatives?	Yes/no
School connectedness	7 items, each on 5-point scales, e.g., How much do you feel that your teachers care about you?	Continuous
Peer attitudes toward pregnancy	Would your peers be angry if you were involved in a pregnancy?	Yes/no
Family connectedness	11 items, each on 3-point scales, e.g., How close do you feel to your mother?	Continuous
Sexual abuse	2 items, Have you ever been forced to have sexual intercourse? Have you ever been sexually abused?	Yes (for selecting either)/no
Lifetime substance use	Lifetime frequency of using alcohol, marijuana, cocaine, hallucinogens, mushrooms, inhalants, amphetamines, heroin, an injected illegal drug, steroids without a doctor's permission, prescription pills without a doctor's consent	High/low
Noncondom contraceptive use at the last incident of sexual intercourse	Last time you had sexual intercourse, what method(s) did you or your partner use to prevent pregnancy? Birth control pills, Depo Provera, diaphragm/contraceptive sponge, withdrawal, emergency contraception	Yes (for selecting any in list)/no
Substance use at last incident of sexual intercourse	Did you drink alcohol or use drugs before you had sexual intercourse the last time?	Yes/no

across survey strata. We conducted all analyses using Stata,[44] incorporating both weights and the complex clustered sampling scheme of the survey. We conducted analyses separately by gender.

We computed descriptive statistics and used logistic regression to calculate unadjusted odds ratios (ORs) for each association. Multivariate logistic models were fitted using backward elimination to determine independent predictors for each outcome. For this procedure, all variables were entered, and at each stage the one with the largest *P* value was removed until all remaining variables contributed significantly ($P<.05$) to the model.

We excluded respondents with missing data on exposure variables from analyses that used those items. For young women, missing at least 1 other response was associated with having lived on a reserve ($P=.02$) and learning about culture from the community ($P=.05$). For young men, missing at least 1 other response was associated with helping neighbors ($P=.05$) and learning about culture from the community ($P=.05$). Having ever had sex, using condoms, and having had more than 1 sexual partner were not related to missing data on exposure variables ($P>.05$ in each case).

RESULTS

There were 2476 students (8.1% of the total sample) who self-identified as Aboriginal. Of these students, 1140 (46.0%) were male and 1336 (54.0%) were female. Of the 1140 young men, 33.7% have ever had sex. Of those, 63.3% have had more than 1 sexual partner, and 21.4% did not use a condom at last incident of sexual intercourse. Of the 1336 young women, 34.8% have ever had sex. Of those, 56.1% have had more than 1 sexual partner, and 40.5% did not use a condom at last incident of sexual intercourse.

The mean age of young women (Table 2) was 14.8 years (range, 12–20), and 26.9% had lived on a reserve. Among young women who have ever had sex, 40.2% reported sexual abuse. Substances were used by 34.9% the last time they had sex, and 30.6% used a noncondom method of contraception at last incident of sexual intercourse.

For young men (Table 2), the mean age was 14.8 years (range, 12–20), and 29.4% had lived on a reserve. Among those who have ever had sex, 10.1% reported sexual abuse, 33.8% had used substances at last incident of sexual intercourse, and 13.8% reported that they used a noncondom method of contraception at last incident of sexual intercourse.

Factors Associated With Having Ever Had Sex

For both young men and young women, the unadjusted analyses showed increasing odds of having ever had sex among those of an older age, a higher level of substance use, and having lived on a reserve. Table 3 shows ORs with 95% confidence intervals (CIs) and *P* values for all unadjusted associations. Increased family and school connectedness were associated with lower odds of having ever had sex. For young women but not young men, the odds of having ever had sex were lower if they perceived that their peers would react angrily to a pregnancy. Table 4 shows adjusted ORs from the multivariate model with 95% CIs and *P* values. The multivariate analyses showed that after adjustment, older age, a high level of substance use, and living on a reserve were still associated with higher odds of having ever had sex for young men. For young women, adjusted analyses showed that school connectedness was associated with lower odds of having ever had sex. However, peer attitudes and family connectedness were no longer significant (Table 4).

TABLE 2—Distribution of Exposure Variables: Aboriginal Adolescent Health Survey, British Columbia, 2003

	Young Women		Young Men	
	Total No.	% or Mean	Total No.	% or Mean
All Aboriginal young people				
Age, y	1336	14.8[a]	1140	14.7[a]
≤14		46.0		48.5
15–16		34.9		30.2
≥17		19.1		21.3
Where learned about culture				
Family	1171	76.4	990	69.9
School	1166	77.5	991	68.0
Community	1167	55.4	983	48.7
Ever lived on a reserve	1163	26.9	974	29.4
Helped in community in the past year	1254	35.4	1057	22.4
Helped neighbors in the past year	1269	69.0	1062	59.2
School connectedness (range, 1–5)	1326	3.53[a]	1123	3.54[a]
Peers would be angry you were involved in a pregnancy	1289	74.8	1075	54.8
Family connectedness (range, 1–3)	1327	2.38[a]	1123	2.50[a]
Higher lifetime substance use	1303	27.2	1098	22.6
Aboriginal young people who have had sexual intercourse				
Ever been sexually abused or forced to have sexual intercourse	437	40.2	346	10.1
Used other contraception at last act of sexual intercourse	436	30.6	354	13.8
Used substance at last act of sexual intercourse	440	34.9	350	33.8

Note. Analyses are based on weighted data and are adjusted for survey design. Total number of all Aboriginal young people in each analysis varied because of missing data. Total number of sexually experienced young women was 445; total number of sexually experienced young men was 360.
[a]Mean value.

Factors Associated With Having More Than 1 Lifetime Sexual Partner

For young women, the unadjusted analyses show that increased school connectedness and helping in the community were associated with having had only 1 partner. Having been sexually abused, learning about culture from the community, and higher levels of substance use were associated with having had more than 1 partner (Table 3). These associations remained in the adjusted analyses (Table 4).

The unadjusted analyses for young men showed that older age and higher levels of substance use were associated with an increased likelihood of having had more than 1 sexual partner, whereas school connectedness was associated with a decreased likelihood (Table 3). After adjustment, there was no longer any association between school connectedness and number of sexual partners (Table 4).

Factors Associated With Condom Nonuse at Last Incident of Sexual Intercourse

Table 3 shows that among young women, the odds of condom nonuse increased with increasing age, having ever lived on a reserve, learning about culture from the community, and using another method of contraception. There was some suggestion that family connectedness was associated with a lower likelihood of condom nonuse (P=.079). After adjustment, these associations remained, and the association between family connectedness and condom use strengthened (Table 4).

The unadjusted analyses show that, among young men, having learned about culture from school was associated with decreased odds of condom nonuse. Having been sexually abused and use (by self or partner) of another form of contraception was associated with an increase in the odds of condom nonuse (Table 3). In the multivariate model, these associations remained, and an association between more family connectedness and lower likelihood of condom nonuse became apparent.

DISCUSSION

The strongest and most consistent factors associated with the sexual behavior of Aboriginal young people in our study were using substances more frequently than peers, experience of sexual abuse, and ever having lived on a reserve. Feeling connected to family was strongly related to increased likelihood of condom use in both genders.

In addition to having strong relations with sexual behavior, both substance use and having been sexually abused are more common among Aboriginal versus non-Aboriginal young people in British Columbia.[45] Therefore, it is imperative that these variables are addressed when planning interventions for this group. Our findings highlight the importance of sexual health promotion efforts for young people living on a reserve and indicate that behavior change interventions need to move beyond the individual and address interpersonal, social, and structural factors.

Findings From Other Studies

The associations observed here between sexual behavior and frequency of substance use, having been sexually abused, and family connectedness are broadly consistent with findings from other populations, although they appear to be especially important for Aboriginal young people. A Minnesota study found that American Indian adolescents who use substances at high levels are more likely to have had sex.[12] A San Francisco study found that sexual abuse among the general population was associated with subsequent low levels of condom use and with having had more than 1 partner.[31] Among a national sample of US adolescents, feeling connected to family was an important predictor of having had sex.[26]

Our findings regarding the importance of living on a reserve contrast with the results of a US study that found status of having lived on a reserve did not predict sexual behavior.[13] There are at least 2 plausible reasons for our observed association—reserves tend to be located in more rural areas[46] and those living on a reserve have lower incomes[19]—both of which are independently associated with sexual

TABLE 3—Unadjusted Associations Between Exposure Variables and Ever Having Had Sex, Having More Than 1 Lifetime Sexual Partner, and Not Using a Condom at Last Sexual Intercourse: Aboriginal Adolescent Health Survey, British Columbia, 2003

	Young Women						Young Men					
	Ever Had Sexual Intercourse (n = 1336)		>1 Lifetime Partner (n = 444)		No Condom at Last Act of Sexual Intercourse (n = 440)		Ever Had Sexual Intercourse (n = 1140)		>1 Lifetime Partner (n = 358)		No Condom at Last Act of Sexual Intercourse (n = 351)	
	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*
Age, y	1.76[a] (1.58, 1.95)	<.001	1.14[a] (0.98, 1.34)	.097	1.40[a] (1.17, 1.67)	<.001	1.67[a] (1.51, 1.85)	<.001	1.17[a] (0.99, 1.38)	.058	1.06[a] (0.86, 1.30)	.592
Learned about culture from family, yes[b]	1.05 (0.72, 1.53)	.786	1.79 (0.98, 3.28)	.057	1.00 (0.54, 1.82)	.990	1.04 (0.69, 1.56)	.849	0.80 (0.40, 1.59)	.518	0.93 (0.50, 1.72)	.812
Learned about culture from school, yes[b]	1.11 (0.78, 1.58)	.549	0.71 (0.40, 1.24)	.228	0.80 (0.44, 1.48)	.481	0.85 (0.62, 1.17)	.320	0.78 (0.44, 1.40)	.408	0.43 (0.24, 0.75)	.003
Learned about culture from community, yes[b]	1.05 (0.75, 1.47)	.780	1.80 (1.01, 3.18)	.045	2.01 (1.13, 3.57)	.017	1.24 (0.84, 1.82)	.285	0.75 (0.40, 1.12)	.374	1.00 (0.53, 1.87)	.995
Ever lived on a reserve, yes[b]	1.60 (1.11, 2.30)	.011	2.16 (1.29, 3.62)	.003	2.09 (1.24, 3.55)	.006	1.79 (1.24, 2.60)	.002	1.19 (0.65, 2.16)	.572	1.32 (0.69, 2.55)	.400
Helped in community, past year, yes[b]	0.98 (0.69, 1.40)	.926	0.45 (0.26, .79)	.005	1.07 (0.60, 1.89)	.826	1.26 (0.84, 1.89)	.268	1.30 (0.65, 2.61)	.463	0.69 (0.34, 1.38)	.288
Helped neighbors, past year, yes[b]	0.75 (0.54, 1.04)	.085	0.95 (0.57, 1.59)	.857	1.02 (0.60, 1.73)	.94	0.93 (0.65, 1.34)	.695	1.16 (0.62, 2.18)	.634	0.94 (0.50, 1.75)	.844
School connectedness (range 1–5), high	0.72[a] (0.60, .87)	.001	0.68[a] (0.48, 0.96)	.029	1.06[a] (0.71, 1.60)	.761	0.78[a] (0.64, .96)	.014	0.67[a] (0.48, 0.94)	.021	1.05[a] (0.70, 1.59)	.805
Peers would be angry if became pregnant, yes[b]	0.58 (0.41, 0.82)	.002	1.00 (0.61, 1.64)	.986	0.69 (0.42, 1.12)	.129	1.05 (0.75, 1.48)	.758	0.91 (0.51, 1.61)	.749	1.18 (0.68, 2.07)	.550
Family connectedness (range 1–3), high	0.55[a] (0.41, 0.72)	<.001	0.62[a] (0.36, 1.06)	.079	0.66[a] (0.39, 1.12)	.122	0.53[a] (0.38, .76)	<.001	0.90[a] (0.51, 1.59)	.727	0.65[a] (0.37, 1.16)	.148
Lifetime substance use, high[c]	7.11 (5.02, 10.09)	<.001	4.78 (2.88, 7.95)	<.001	1.31 (0.77, 2.25)	.321	13.40 (8.94, 20.08)	<.001	2.38 (1.32, 4.29)	.004	1.41 (0.74, 2.67)	.297
Ever been sexually abused, yes[b]	. . .	. . .	1.91 (1.18, 3.09)	.009	1.29 (0.79, 2.12)	.313	. . .	. . .	1.33 (0.52, 3.43)	.554	5.16 (2.40, 11.10)	<.001
Other contraception at last act of sexual intercourse, yes[b]	. . .	. . .	. . .	. . .	60.11 (16.54, 218.47)	<.001	. . .	. . .	. . .	. . .	27.28 (12.95, 57.44)	<.001
Substance use at last act of sexual intercourse, yes[b]	. . .	. . .	. . .	. . .	0.99 (0.56, 1.71)	.958	. . .	. . .	. . .	. . .	1.38 (0.77, 2.48)	.280

Note. OR = odds ratio; CI = confidence interval. Analyses were based on weighted data and were adjusted for survey design. Range refers to the number of participants in each analysis, which vary slightly because of missing data: for young women who had ever had sex, the range was 1163 to 1336; for young women with more than 1 lifetime partner, the range was 387 to 444; for young women who did not use a condom at sexual intercourse, the range was 385 to 440; for young men who have ever had sexual intercourse, the range was 974 to 1140; for young men with more than 1 lifetime partner, the range was 317 to 358; for young men who did not use a condom at last sexual intercourse, the range was 310 to 351.

[a]OR should be interpreted as increase in odds of outcome for every unit increase in exposure score.

[b]The referent category was "No."

[c]The referent category was "Low."

TABLE 4—Adjusted Associations Between Exposures and Having More Than 1 Lifetime Partner and Not Using a Condom at Last Sexual Intercourse: Aboriginal Adolescent Health Survey, British Columbia, 2003

Exposure Variable	AOR[a] (95% CI)	*P*
Young women		
Ever had sexual intercourse (n = 1131)		
Increasing age (years)	1.68[b] (1.49, 1.89)	< .001
Higher lifetime substance use	4.02 (2.62, 6.16)	< .001
Ever lived on a reserve	1.59 (1.05, 2.42)	.029
Higher school connectedness (range, 1–5)	0.74[b] (0.56, 0.97)	.030
Had more than 1 sex partner (n = 351)		
Increasing age (years)	1.24[b] (1.02, 1.52)	.030
Higher lifetime substance use	6.12 (3.54, 10.59)	< .001
Ever been sexually abused or forced to have sexual intercourse	1.95 (1.11, 3.44)	.021
Learned about culture from school	0.48 (0.24, 0.95)	.035
Learned about culture from community	2.14 (1.17, 3.93)	.014
Helped in community, past year	0.32 (0.17, 0.63)	.001
Condom nonuse at last act of sexual intercourse (n = 378)		
Increasing age (years)	1.51[b] (1.10, 2.07)	.011
Ever lived on a reserve	7.80 (3.25, 18.73)	< .001
Higher family connectedness (range, 1–3)	0.43[b] (0.19, 0.99)	.048
Learned about culture from family	0.37 (0.16, 0.86)	.021
Contraceptive use	101.34 (30.05, 341.73)	< .001
Young men		
Ever had sexual intercourse (n = 858)		
Increasing age (years)	1.51[b] (1.35, 1.69)	< .001
Higher lifetime substance use	9.98 (6.13, 16.24)	< .001
Ever lived on a reserve	1.88 (1.19, 2.99)	.007
Had more than 1 sex partner (n = 297)		
Increasing age (years)	1.09[b] (0.92, 1.28)	.324
Higher lifetime substance use	2.22 (1.24, 3.97)	.007
Condom nonuse at last act of sexual intercourse (n = 334)		
Increasing age (years)	0.97[b] (0.75, 1.27)	.849
Higher family connectedness (range, 1–3)	0.48[b] (0.26, 0.91)	.023
Used noncondom contraception at last act of sexual intercourse	39.66 (16.48, 95.46)	< .001
Ever been sexually abused or forced to have sexual intercourse	4.52 (1.69, 12.09)	.003

Note. AOR = adjusted odds ratio; CI = confidence interval. Analyses are based on weighted data and are adjusted for survey design.
[a]Adjusted for all other variables in the model.
[b]AOR should be interpreted as increase in odds of outcome for every unit increase in exposure score.

behavior. Unfortunately, it was not possible to establish the independent effects of those factors because they were not measured in the survey. Also, half of the young people who had ever lived on a reserve were not living on one at the time of the survey and therefore had moved at least once. This may indicate family instability in some cases, which is related to sexual behavior.[47]

Young women who helped in their communities in the past year were less likely to have had multiple sexual partners; otherwise, community factors were not predictive of sexual behavior. At least 1 study has found that volunteering can be positively or negatively related to sexual risk, depending on the type of organization.[21] Participation in different aspects of what young people define as their "community" may have both positive and negative effects on sexual behavior.

Although school connectedness is associated with positive sexual health outcomes in other populations of young people[26] and with never having had sex among American Indian young people,[12] it was of less importance for Canadian Aboriginal young people after adjusting for other factors. Here, only among young women was increased school connectedness related to never having had sex. Other research has shown that Aboriginal young people are generally less connected to school[45] than are their non-Aboriginal peers and that they leave school earlier.[48] The lack of observed association may reflect a general lack of relevance of the school environment among Aboriginal young people. Similarly, peer attitudes toward pregnancy were unrelated to outcomes after adjusting for other factors. Cultural knowledge variables did not have a consistent relation with sexual behavior and produced results both supporting and contradicting our hypotheses.

Strengths and Limitations

Our population-based, probability survey of young people's health behaviors is unique in Canada and had a larger sample of Aboriginal respondents than other sexual behavior research.[15] We were able to include both young people who live on a reserve and those who live off a reserve, unlike many other surveys. However, this includes a diverse set of peoples with distinct cultures and experiences of colonization in a wide variety of geographic locations. Variation among different Aboriginal groups may influence the relative importance of the associations presented here; however, we could not explore this possibility because more-detailed information on Aboriginal heritage was not available. However, many associations observed in this study are also important for young people from other populations, indicating that at least some factors are important across ethnic groups. Similar to other school-based surveys, young people who were absent from school and were unable to participate in our survey are likely to be at higher risk; different factors may better predict sexual behavior among them. Our analysis is also limited by the use of self-reported data; but in most sexual behavior research, there is no "gold standard" against which to measure this.

Implications for Health Promotion and Research

The strong relations observed between sexual behavior and substance use, experience of sexual abuse, and feeling unconnected to family point to the need for integration of programs and services for this population. Given the high prevalence of both alcohol use and experience of sexual abuse among Canadian Aboriginal young people,[45] programs that address these factors may have a large impact on sexual behavior and STI incidence in this group. Also, those in substance use or sexual abuse treatment programs and those who have been in contact with child protective services may benefit from increased sexual health promotion efforts.

Several strong predictors of sexual health behaviors for Aboriginal young people are beyond individual control, underlining the need for higher-order prevention efforts. Reserve communities may be among the best places to create successful community-level interventions. Further research is needed to understand why the behavior of on versus off reserve young people differs; however, in the interim, there is an obvious need to consider increasing sexual risk reduction support to on-reserve young people. Qualitative work shows that young people perceive that adult alcohol use in their communities influences their own alcohol use.[20] Addressing substance use at the community level may encourage young people to alter their behavior and reduce their sexual risk. Community leaders have already established various initiatives that address the specific needs of indigenous young people (e.g., as shown in Prentice[49]). At the policy level, those serving Aboriginal young people can advocate funding and evaluation of these efforts.

Importantly, most young people participating in this study felt "somewhat" or "very" connected to their family, illustrating that many Canadian Aboriginal families have successfully maintained relationships that contribute to healthy child development. Future research should explore which aspects of family communication and relationships promote feelings of connection in these Aboriginal families. Interventions for young people who feel unconnected to their families should explore incorporating these elements. Similarly, incorporation of cultural factors into interventions should be further researched. Although "cultural knowledge" as measured here did not have a clear relation with outcomes, other concepts such as "cultural continuity" are related to health outcomes[50] and may have more predictive value. Further work is needed to clarify the mechanisms by which sexual victimization and substance use are related to sexual behavior. Sexual behavior interventions should consider including elements from successful substance use and sexual abuse prevention interventions.

Conclusions

Interventions to reduce sexual behaviors associated with increased risk of STI and unwanted pregnancy among Aboriginal young people should be carried out in conjunction with programs aimed at addressing substance use and sexual abuse. These programs need to be geared especially to young people living on-reserve. Including elements that promote feelings of family connectedness should be explored. Several key correlates of behavior are beyond individual control, suggesting that a combination of individual- and social-level interventions are needed to produce behavior change for Aboriginal young people. ■

About the Authors

At the time of the study, Karen M. Devries was a PhD student at the London School of Hygiene and Tropical Medicine, London, England. Caroline J. Free and Linda Morison were also with the London School of Hygiene and Tropical Medicine, London. Elizabeth Saewyc was with the McCreary Centre Society Vancouver, British Columbia, and the University of British Columbia, Vancouver.

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Contributors

K.M. Devries conceptualized, designed, and conducted all analyses and wrote the article. C.J. Free supervised the design of the present analyses. L. Morison provided input into the design and statistical advice about the analyses. E. Saewyc provided input into the design and conduct of the analyses. All authors commented critically and revised the article.

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Human Participation Protocol

This study was approved by the London School of Hygiene and Tropical Medicine and the University of British Columbia's ethical review boards.

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