Factors Associated with Pregnancy and STI among Aboriginal Students in British Columbia

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ABSTRACT

Background: Aboriginal adolescents are more likely to become pregnant and contract an STI than other Canadian adolescents. This study provides some of the first data on factors associated with these outcomes among Aboriginal adolescents.

Methods: A secondary analysis was conducted using 2003 data from a large cross-sectional survey of British Columbia secondary school students. 445 young women and 360 young men who identified as Aboriginal and reported ever having sex were included in analyses. Associations between self-reported pregnancy and STI and 11 exposure variables were examined using logistic regression.

Results: Of young women, 10.6% reported a pregnancy; 10.5% of young men reported causing a pregnancy. An STI diagnosis was reported by 4.2% of young women and 3.9% of young men. In multivariate analyses for young men, ever having been sexually abused was the strongest consistent risk factor for causing a pregnancy (AOR=4.30, 95% CI 1.64-11.25) and STI diagnosis (AOR=5.58, 95% CI 1.61-19.37). For young women, abuse was associated with increased odds of pregnancy (AOR=10.37, 95% CI 4.04-26.60) but not STI. Among young women, substance use was the strongest consistent risk factor for both pregnancy (AOR=3.36, 95% CI 1.25-9.08) and STI (AOR=5.27, 95% CI 1.50-18.42); for young men, substance use was associated with higher odds of STI (AOR=4.60, 95% CI 1.11-19.14). Factors associated with decreased risk included community, school and family involvement.

Conclusions: Health care professionals, communities and policy-makers must urgently address sexual abuse and substance use. Exploring promotion of school and community involvement and family cohesion may be useful for sexual health interventions with Aboriginal students.

Key words: North American Indians; child sexual abuse; sexually transmitted diseases; adolescent pregnancy; substance abuse

La traduction du résumé se trouve à la fin de l'article.

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Aboriginal young people in Canada and the US are over-represented in adolescent pregnancy and sexually transmitted infection (STI) statistics and under-represented in sexual health research.¹⁻³ The reasons for disparities in sexual health outcomes are not fully understood, and indigenous scholars stress the importance of colonial history, lack of access to health care services and socio-economic disadvantage.^{4,5} Even less is known about how to effectively intervene to reduce sexual risk.

Observational literature that could inform intervention development for this population is scant. The few studies that focus on the sexual health of Aboriginal young people tend to be qualitative in nature or use small samples from particular Nations.^{6,7} Only one large US study examining correlates of adolescent pregnancy in a school-based sample of indigenous adolescents has been conducted, which looked at pregnancy and sexual orientation.⁸ One population-based survey conducted in Canada during the 1990s focused on STI, but it sampled adults living on-reserve in Ontario.⁹ Several existing cohort studies in BC do include Aboriginal young people, but are restricted to injection drug and other substance users in Vancouver and/or Prince George.^{10,11} Thus there is a clear need for information on factors underlying increased risk of adolescent pregnancy involvement and STI diagnosis among broader populations of young Aboriginal people in Canada.

The present study sought to determine the key predictors of self-reported pregnancy involvement and STI diagnosis in a large probability sample of Aboriginal secondary school students.

METHODS

Design

Secondary analyses were conducted using data from the British Columbia Adolescent Health Survey 2003 (BC AHS 2003).¹² The AHS invites

all 59 BC School Districts to participate, and in 2003, 45 agreed to allow access to students. In these 45 districts, a stratified random sample of 1,557 grade 7-12 classrooms from all types of schools (including those on- and off-reserve) was selected. All 40,040 students from these classrooms were eligible to participate. Informed consent was sought either from students (with parental notification) or parents (with student assent). The response rate among students was 76%, or 30,588 usable questionnaires in the participating districts. Students who did not participate were absent on the day of the survey (12%), failed to return the parental consent form (7%), or they/their parents refused to participate (3%). More details about survey design are available elsewhere.¹²

Ethical consultation and approval

At the outset of the project, Aboriginal community members were approached to ensure the proposed work would be conducted in an ethical and sensitive way that would directly benefit the Aboriginal community. Subsequently, institutional approvals were granted from the London School of Hygiene and Tropical Medicine and University of British Columbia Ethical Review Boards.

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Table 1. Measurement of Exposure Variables

Factor	Variable	Measurement
Age	What is your age in years?	Continuous
Cultural knowledge-Family	How much have you learned about culture from your family?	Some or a lot/none
Cultural knowledge-School	How much have you learned about culture from your school?	Some or a lot/none
Cultural knowledge-Community	How much have you learned about culture from your community?	Some or a lot/none
Reserve	Have you ever lived on-reserve?	Ever/never
Community involvement-Community	In the past 12 months, did you help others without pay by: helping out in your community?	Yes/no
Community involvement-Neighbours	In the past 12 months, did you help others without pay by: helping neighbours or relatives?	Yes/no
School connectedness	7-item scale, e.g., How much do you feel that your teachers care about you?	Continuous
Peer attitudes towards pregnancy	Would your peers be angry if you were involved in a pregnancy?	Yes/no
Family connectedness	11-item scale, e.g., How close do you feel to your mother?	Continuous
Sexual abuse	2-item measure: Have you ever been forced to have sexual intercourse when you did not want to?; Have you ever been sexually abused?	Yes for selecting either/no
Lifetime substance use	11-item measure: Lifetime frequency of using: Alcohol; Marijuana; Cocaine; Hallucinogens; Mushrooms; Inhalants; Amphetamines; Heroin; Injected an illegal drug; Steroids without a doctor's permission; Prescription pills without a doctor's consent.	High/low (Dichotomized on median)

Table 2. Distributions of Exposures and Unadjusted Associations between Exposure Variables, Ever Being Pregnant and Ever Having an STI among BC Aboriginal Young Women (n=438*)

Exposure Variable		Full Sample		Ever Been Pregnant			Ever Had STI				
		% or mean†	% or mean†	OR	95% CI	p	% or mean†	OR	95% CI	p	
Age (years)‡			15.8	16.2	1.22	0.89-1.67	0.211	16.1	1.19	0.79-1.80	0.410
Structural factors											
Have learned about culture from family	No	23.0%	4.8	1			1.8	1			
	Yes	77.0%	12.4	2.81	1.03-7.61	0.043	5.0	2.98	0.87-10.24	0.083	
Have learned about culture from school	No	21.4%	13.2	1			5.6	1			
	Yes	78.6%	10.0	0.73	0.29-1.80	0.490	4.0	0.70	0.22-2.25	0.549	
Have learned about culture from community	No	43.8%	7.9	1			4.3	1			
	Yes	56.2%	12.9	0.74	0.72-4.22	0.221	4.4	1.02	0.27-3.94	0.974	
Ever lived on-reserve	No	67.5%	7.7	1			4.1	1			
	Yes	32.5%	16.8	2.42	1.05-5.58	0.039	4.7	1.15	0.35-3.81	0.821	
Interpersonal factors											
Helped out in community, past year	No	64.5%	14.5	1			3.9	1			
	Yes	35.5%	4.5	0.28	0.13-0.62	0.002	4.9	1.26	0.28-5.68	0.761	
Helped neighbours, past year	No	35.6%	14.2	1			6.5	1			
	Yes	64.5%	9.3	0.62	0.28-1.40	0.249	3.0	0.44	0.11-1.70	0.233	
School connectedness‡ (range 1-5)		3.42	3.3	0.71	0.43-1.16	0.167	3.41	1.00	0.48-2.12	0.990	
Peers would be angry if became pregnant	No	32.0%	11.6	1			4.2	1			
	Yes	68.0%	9.9	0.84	0.40-1.79	0.655	4.3	1.01	0.33-3.08	0.980	
Family connectedness‡ (range 1-3)		2.29	2.23	0.73	0.35-1.51	0.397	1.91	0.21	0.06-0.77	0.018	
Individual factors											
Lifetime substance use	Low	47.2%	5.2	1			1.2	1			
	High	52.8%	15.6	3.38	1.35-8.47	0.009	7.1	6.45	1.86-22.43	0.003	
Sexual abuse ever	No	59.7%	2.7	1			3.4	1			
	Yes	40.3%	22.7	10.71	4.29-26.77	<0.001	5.3	1.58	0.45-5.56	0.478	

Analyses based on weighted data and adjusted for survey design.

* Actual numbers in each analysis range from 382-438 because of missing data.

† Distribution of outcome in each exposure category. Mean for continuous variables (age, school connectedness, family connectedness).

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

Participants

Only young people who self-identified as Aboriginal/First Nations and answered yes to the question "Have you ever had sexual intercourse ("gone all the way")?" were included in analyses.

Measures

Measures in the BC AHS relevant to these analyses were mainly drawn from large-scale school-based surveys from the US.^{13,14} Both outcomes – self-reports of ever having been pregnant and ever having been diagnosed with an STI by a doctor or other health professional – were measured using binary variables. Eleven exposure variables and one confounder (age) were examined in relation to each outcome (Table 1). Scores for family and school connectedness and substance use measures were computed by summing item scores and dividing by the number of items completed. School and family connectedness were modeled as continuous variables. Level of substance use for individuals were classified as either above or

below the median lifetime substance use for all Aboriginal young people, and modeled as a binary variable. Cronbach's alpha for school connectedness was 0.81 for young women and 0.80 for young men; for family connectedness, alpha was 0.86 for both sexes.

Statistical analyses

All analyses were conducted using STATA 9.0,¹⁵ which handles weighted data and correctly estimates variance while accounting for complex survey sampling. Logistic regression was used to calculate unadjusted and adjusted odds ratios for each association. Backward elimination was used to fit a multivariate logistic regression model to determine the most important predictors of pregnancy and STI diagnosis. All variables were entered into the model, and the one with the lowest odds ratio and p-value was removed. The model was re-run and this step repeated until only variables with p<0.05 remained.

Table 3. Distributions of Exposures and Unadjusted Associations between Exposure Variables, Ever Causing a Pregnancy and Ever Having an STI among BC Aboriginal Young Men (n=347*)

Exposure Variable		Full Sample		Ever Caused a Pregnancy			Ever Had STI				
		% or mean†	% or mean†	OR	95% CI	p	% or mean†	OR	95% CI	p	
Age (years)‡			15.8%	16.0	1.07	0.83-1.39	0.581	15.5	0.88	0.68-1.12	0.292
Structural factors											
Have learned about culture from family	No	28.7%	9.2	1			2.1	1			
	Yes	71.3%	11.2	1.24	0.56-2.78	0.596	5.1	2.44	0.59-10.08	0.216	
Have learned about culture from school	No	35.3%	13.9	1			6.6	1			
	Yes	64.7%	8.8	0.60	0.30-1.18	0.141	2.9	0.43	0.15-1.22	0.114	
Have learned about culture from community	No	49.0%	7.5	1			3.8	1			
	Yes	51.0%	13.1	1.86	0.92-3.74	0.084	4.6	1.21	0.40-3.65	0.731	
Ever lived on-reserve	No	62.3%	5.7	1			3.6	1			
	Yes	37.7%	18.8	3.81	1.78-8.10	0.001	4.9	1.39	0.48-4.03	0.546	
Interpersonal factors											
Helped out in community, past year	No	75.9%	10.1	1			4.1	1			
	Yes	24.1%	13.3	1.36	0.59-3.13	0.474	3.3	0.80	0.24-2.70	0.718	
Helped neighbours, past year	No	42.1%	12.2	1			3.4	1			
	Yes	57.9%	10.0	0.80	0.38-1.66	0.540	4.3	1.29	0.41-3.95	0.653	
School connectedness‡ (range 1-5)		3.45	3.07	0.50	0.32-0.77	0.002	2.93	0.43	0.23-0.80	0.008	
Peers would be angry if became pregnant	No	44.6%	15.4	1			6.1	1			
	Yes	55.4%	6.8	0.40	0.19-0.87	0.021	2.0	0.32	0.09-1.15	0.081	
Family connectedness‡ (range 1-3)		2.38	2.18	0.46	0.25-0.85	0.013	2.18	0.49	0.16-1.45	0.196	
Individual factors											
Lifetime substance use	Low	46.5%	9.8	1			1.5	1			
	High	53.5%	10.4	1.07	0.51-2.24	0.867	5.4	3.65	1.10-12.17	0.035	
Sexual abuse ever	No	90.0%	8.2	1			2.9	1			
	Yes	10.0%	33.8	2.70	2.46-13.19	<0.001	14.0	5.50	1.82-16.61	0.003	

Analyses based on weighted data and adjusted for survey design.

* Actual numbers in each analysis range from 306-347 because of missing data.

† Distribution of outcome in each exposure category. Mean value for continuous variables (age, school connectedness, family connectedness)

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

Missing data

Participants with missing data on particular items were excluded from analyses involving those items. Outcomes were not related to missing one or more responses ($p > 0.05$ for each).

RESULTS

In the BC AHS 2003, 2,476 participants identified as Aboriginal (8.1% of the full AHS sample). Of 1,336 young women, 445 (34.8%) had ever had sex. Of 1,140 young Aboriginal men, 360 (33.7%) had ever had sex. Among young women who had ever had sex, 10.6% reported ever being pregnant and 4.2% had ever been diagnosed with an STI. Among young men who had ever had sex, 10.5% had ever caused a pregnancy and 3.9% had ever been diagnosed with an STI. The distribution of exposure variables and unadjusted results are outlined in Tables 2 (young women) and 3 (young men); multivariate results are outlined in Table 4.

Young women

Among young women who had ever had sex, 32.5% had ever lived on a reserve, 77.0% had learned about culture from their family, and 40.3% reported ever having been sexually abused. Unadjusted results indicate that having learned about culture from family, ever having lived on a reserve, higher lifetime substance use relative to peers, and ever having been sexually abused were associated with increased odds of pregnancy. Having helped in the community in the past year was associated with decreased odds of pregnancy. For the STI outcome, only higher lifetime substance use was associated with increased odds of STI; feeling more connected to family was associated with decreased odds.

After multivariate modelling, the relationships between pregnancy and sexual abuse, substance use and helping in the community remained significant. For STI, both lifetime substance use and feeling connected to family remained significant.

Young men

Among young men who had ever had sex, 37.7% had ever lived on a reserve, 71.3% had learned about culture from their family, and 10.0% reported ever having been sexually abused. Unadjusted estimates show that increased odds of causing a pregnancy were associated with learning about culture from the community, having lived on-reserve, and having been sexually abused. Feeling more connected to school and to family, and having peers who would be angry if you caused a pregnancy were associated with decreased odds of causing a pregnancy. For the STI outcome, using more substances and having been sexually abused were associated with increased odds of STI; feeling more connected to school and having peers who would be angry if you caused a pregnancy were associated with decreased odds of STI.

Multivariate models indicated that living on-reserve, sexual abuse and school connectedness were significant independent predictors of pregnancy involvement. For the STI outcome, lifetime substance use and sexual abuse remained important predictors, and learning about culture from family emerged as a factor associated with increased odds of STI.

DISCUSSION

This rare glimpse into the sexual health of Aboriginal young people reveals that sexual abuse and substance use are prevalent and strongly associated with self-reported pregnancy and STI diagnosis among Aboriginal young people attending school. Fostering connections to school, family and community may be promising strategies for intervention.

Limitations

The survey does not represent Aboriginal young people who are not attending school, and our results should not be interpreted as generalizable to this group. Aboriginal young people are more likely than non-Aboriginal young people to leave school after Grade

Table 4. Most Important Factors Associated with Pregnancy and STI among Young Aboriginal Men and Women

	Exposure Variable	AOR*	95% CI	p
Pregnancy Young women (n=399)	Age† (years)	1.26	0.94-1.69	0.119
	Higher lifetime substance use	3.36	1.25-9.08	0.017
	Ever been sexually abused	10.37	4.04-26.60	<0.001
	Helped out in community, past year	0.29	0.12-0.70	0.006
	Young men (n=278)			
	Age† (years)	1.19	0.90-1.58	0.225
	School connectedness† (range 1-5)	0.52	0.32-0.84	0.007
	Ever been sexually abused	4.30	1.64-11.25	0.003
	Ever lived on-reserve	3.60	1.65-7.86	0.001
Ever had STI Young women (n=399)	Age† (years)	1.36	0.92-2.03	0.127
	Higher lifetime substance use	5.27	1.50-18.42	0.009
	Family connectedness† (range 1-3)	0.22	0.07-0.65	0.006
	Young men (n=297)			
	Age† (years)	0.90	0.64-1.26	0.530
	Higher lifetime substance use	4.60	1.11-19.14	0.035
	Learned about culture from family	7.11	1.47-34.32	0.015
	Ever been sexually abused	5.58	1.61-19.37	0.007

Analyses based on weighted data and adjusted for survey design.

* Adjusted for all other variables in model.

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

10,¹⁶ making this particularly important for older adolescents. Self-reported pregnancy has been shown to be more accurate than self-reported STI diagnosis among adolescent girls,^{17,18} however, both tend to be underestimates of actual prevalence, particularly for STIs. Obviously, self-reported pregnancy has less validity for young men than for young women; however, no better measure exists. The possibility of type II errors must also be acknowledged, especially in the STI analyses where prevalence of the outcome is low.

Findings in relation to other studies

No previous work has examined relationships between sexual abuse and pregnancy among a probability sample of Canadian Aboriginal adolescents. Our findings of a relationship between sexual health outcomes and sexual abuse¹⁹⁻²² and substance use^{23,24} are consistent with findings from other groups. However, the prevalence of sexual abuse was very high in this sample – some 40% of young women and 10% of young men who have ever had sex report being sexually abused. This is markedly higher than among non-Aboriginal students.²⁵ Sexual abuse is also highly correlated with potentially risky sexual behaviour among Aboriginal students;²⁶ thus sexual abuse is extremely important to tackle in risk reduction interventions for Aboriginal students. Similarly, Aboriginal students report higher levels of substance use than non-Aboriginal students.²⁵ Although the mechanism by which substance use is associated with increased likelihood of these outcomes is subject to debate,²³ it is obviously an important contextual factor which must be accounted for in interventions, regardless of whether or not the association is causal.

At the interpersonal level, community volunteering in the past year was a key predictor of decreased odds of pregnancy for Aboriginal young women but not for Aboriginal young men. In other groups, both positive and negative relationships with community involvement and sexual health have been found, which may be due to the types of organizations people are involved with.²⁷⁻²⁹

School connectedness encompasses feelings of safety and belonging, and is related to positive sexual health outcomes in other populations of young people.²⁴ For young Aboriginal men, it appears that the school environment also is associated with decreased risk; it did not emerge as a key predictor for young women. In the present sample, however, we would expect a conservative estimate of the effects of school connectedness for young women, since those

who were less connected as well as those with children were probably more likely to be absent on the day of the survey.

Instead, for young women, feeling connected to family was related to decreased likelihood of self-reported STI in multivariate analyses. This is consistent with findings from other populations where family connectedness and other family health variables predict decreased sexual risk.^{24,30,31} For young men, higher family connectedness decreased the odds of pregnancy in unadjusted analyses but was not a strong independent predictor after other factors were accounted for.

Having lived on-reserve was strongly associated with increased risk of pregnancy involvement among young men, consistent with an increased likelihood of risky sexual behaviours among BC on-reserve young people.²⁶ Further research is needed to establish why; reasons may include the rural location of most reserves,³² lower socio-economic status of residents,^{33,34} or differing cultural values regarding timing of pregnancy.⁴ Learning about culture from the family also emerged as a risk factor in STI analyses, but was only significant in the multivariate model for young men. It is possible that this is simply a statistical artifact owing to low case numbers for the STI analysis, but this link is worth further investigation.

Future directions for programming

Aboriginal young people attending secondary school are clearly in need of sexual risk reduction interventions. At the individual level, students who have been sexually abused and who use more substances are at greater risk of pregnancy and STI; provision of sexual risk reduction programming that addresses history of sexual abuse and substance use may help individuals reduce their risk. However, in an environment where Aboriginal students experience more sexual abuse,²⁵ use more substances,²⁵ are generally less connected to school²⁵ and leave school at an earlier age¹⁶ than their non-Aboriginal peers, individualist approaches are likely to yield only limited success. Aboriginal leaders continually call for population-level policy and programming to address the root causes of ill-health; funding and evaluation of these efforts are needed both on- and off-reserve.

CONCLUSION

Sexual health interventions for in-school Aboriginal young people must address substance use and sexual abuse, and must operate at

a broader social level rather than focusing only on treatment/support for individuals.

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RÉSUMÉ

Contexte : Une adolescente autochtone est plus susceptible de devenir enceinte et contracter une ITS que toute autre adolescente canadienne. Cette étude présente les premières données sur les facteurs associés à ces résultats chez les adolescentes autochtones.

Méthodes : Une analyse secondaire a été réalisée à l'aide des données recueillies en 2003 dans le cadre d'une importante enquête ponctuelle effectuée auprès d'étudiants de niveau secondaire de la Colombie-Britannique. La population de l'analyse comprenait 445 jeunes femmes et 360 jeunes hommes s'identifiant comme des Autochtones et déclarant qu'ils avaient eu des relations sexuelles. Les associations entre la grossesse autodéclarée et l'ITS et 11 variables d'exposition ont été examinées à l'aide d'une analyse de régression logistique.

Résultats : 10,6 % des jeunes femmes ont déclaré une grossesse; 10,5 % des jeunes hommes ont indiqué qu'ils avaient causé une grossesse. Un diagnostic d'ITS a été signalé par 4,2 % des jeunes femmes et par 3,9 % des jeunes hommes. Pour ce qui est des analyses multidimensionnelles sur les jeunes hommes, le fait d'avoir été victime de violence sexuelle constitue le plus important facteur de risque conséquent d'avoir causé une grossesse (AOR=4,30; IC95 % : 1,64-11,25) et du diagnostic d'ITS (AOR=5,58; IC95 % : 1,61-19,37). Chez les jeunes femmes, la violence sexuelle a été associée aux probabilités accrues de grossesse (AOR=10,37; IC95 % : 4,04-26,60), mais non au diagnostic d'ITS. Chez les jeunes femmes, la consommation d'alcool et d'autres drogues a été associée aux probabilités accrues de grossesse (AOR=3,36; IC95 % : 1,25-9,08) et de contracter une ITS (AOR=5,27; IC95 % : 1,50-18,42); chez les jeunes hommes, la consommation d'alcool et d'autres drogues a été associée aux probabilités accrues de contracter une ITS (AOR=4,60; IC95 % : 1,11-19,14). Les facteurs suivants ont été associés à une diminution du risque : participation aux activités communautaires, scolaires et familiales.

Conclusions : Les professionnels de la santé, les collectivités et les décideurs doivent urgemment traiter du problème de violence sexuelle et de consommation d'alcool et d'autres drogues. L'exploration des possibilités de favoriser la participation aux activités scolaires et communautaires et la cohésion familiale pourraient contribuer aux efforts d'intervention sur la santé sexuelle des étudiants autochtones.

Mots clés : Autochtones d'Amérique du Nord; sévices sexuels des enfants; maladies transmises sexuellement; grossesse chez l'adolescente; consommation d'alcool et d'autres drogues