RESEARCH

Factors Associated with PAP Testing in Adolescents in Northern Nova Scotia

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ABSTRACT

Objective: To determine relationships of socio-economic factors and contraceptive behaviours with PAP testing in sexually active women aged 15-19 who had received physician services in northern Nova Scotia in the previous year.

Methods: A cross-sectional survey was completed by adolescents attending four high schools in three counties in northern Nova Scotia. Questions concerned contraceptive behaviours, socio-economic status and health services use, including PAP testing. Associations of socio-economic factors and contraceptive behaviours with receipt of a PAP test in the previous year were examined in women who were sexually active for at least one year, and who also had visited a physician during the previous year.

Results: One thousand and ninety adolescent women aged 15-19 completed surveys, with a response rate of 91%. Of the 396 (36.3%) who reported being sexually active and having visited a physician in the previous year, 393 provided information about PAP testing. Of these, 214 (54.5%) reported receiving a PAP test. Factors associated with PAP testing included viewing one's family as advantaged and living in a major town as opposed to a more rural area. Compared with using hormonal contraception, using either condom without other effective contraception or no effective contraception at last intercourse were negatively associated with PAP testing.

Conclusions: These findings suggest that physicians use hormonal contraception as a cue for PAP testing in adolescent women. Guidelines call for regular PAP testing of sexually active adolescents, and efforts to increase adolescent PAP testing should include professional development to increase recognition of sexual activity.

MeSH terms: Adolescent; Papanicolaou smear; contraception

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

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The incidence of cervical cancer decreased by 52% from 1971-2001 in Nova Scotia, a province with a cervical screening program since 1991. Even with such improvements, Nova Scotia has the highest rate of invasive cervical cancer in Canada.[1] Screening for cervical cancer using the Papanicolaou (PAP) smear is an effective means of reducing incidence of this disease.[2]

Nova Scotia has a population of approximately 30,000 young women aged 15-19, many of whom are sexually active. Approximately 40% of grade 10, 50% of grade 11, and 60% of grade 12 students have had vaginal intercourse at least once.[3-5] Even though Nova Scotia PAP test guidelines call for annual testing of all sexually active young women, a recommendation consistent with other Canadian screening guidelines,[6] fewer than 30% of women age 15-19 are screened annually. Screening has declined among women in this age group from 1993-2001 by just over 2%,[1] even though more young people are engaging in intercourse at younger ages.[7] Screening levels are higher in older age groups; for example in those aged 20-24, it is 60% and in those aged 25-29, it is 64%.[1] The fact that only about 50% of those aged 15-19 are sexually active, while by age 25 over 95% are sexually active,[7] will account for some differences in testing. However, little is known about why limited PAP testing occurs in adolescents.

Since we have detected associations of increased self-reported STD testing with young women's use of hormonal contraception in Nova Scotia,[8] we felt there could be similar relationships of contraceptive behaviours with PAP testing. We hypothesized that young women who were sexually active and used hormonal contraception would receive more testing than those who did not, even where they had had an opportunity for screening by a physician. Associations of lower levels of PAP testing with lower socio-economic status (SES) have been seen in Manitoba,[9] and in Nova Scotia.[10] We therefore also wished to determine whether associations of SES with PAP testing held true for this adolescent population.

METHODS

Students aged 15-19 in grades 10-12 at four high schools in three counties in northern

Nova Scotia participated in a survey that asked about their health, sexual behaviours, socio-economic status and use of health services, including PAP testing. These high schools serve approximately 40% of students aged 15-19 in these counties.

Obtaining information about family income from adolescents is difficult,[11] but education and work patterns of parents correlate with household income.[12] We therefore asked students about parental education (completion of high school or less, vs. more than high school); and parental employment (employed full time vs. not employed full time), as well as family structure (two-parent family vs. other living arrangement). We asked students if they felt that their family was advantaged compared with others, and about their school grade in the previous year (average grade <80% vs. ≥80%). We also asked students if they lived in a county seat (referred to as a "major town") with populations of approximately 10,000, or if they were from smaller towns, villages, or farming areas.

Sexual behaviour, SES and physician services questions were formulated by the investigators. Face and content validity for these questions were established by a national panel consisting of Canadian clinician researchers and public health professionals with expertise in sexual health. Reliability was established by repeat questionnaire administration to 31 students at another school. Kappa statistics ranged from 0.76 to 1.0.[13]

To examine the influence of type of contraception at last intercourse on receiving a PAP test, we created three classes of contraception: hormonal contraception, which refers to using either oral contraception or injectable contraception, whether used in combination with other methods or not; condom only, which refers to using only a condom at last intercourse, without other effective method(s); and no effective method, which refers to using any one of foam, sponge, or withdrawal alone, all of which are ineffective forms of contraception.[14]

The survey took approximately fifty minutes to complete and was administered by trained teachers during scheduled class time. Members of the research team provided assistance where necessary. All surveys were administered in May 2003. Informed consent was obtained from students. The Dalhousie University Health Sciences Human Research Ethics Board granted ethical approval for the research.

Analysis was performed using SPSS Version 11.5. First, in univariate analysis, using the X^2 statistic, we examined the extent to which all sexually active female students (i.e., those who had had vaginal intercourse at least once) indicated having had PAP testing in the previous year, by grade. Next, we examined in univariate analysis by school grade the personal characteristics and contraceptive behaviours of young women whose first sexual experience was at least one year ago and who had also made a physician visit at least once (for any reason) during that year. Then, associations of these same factors with having received a PAP test in the previous year were tested. Finally, stepwise logistic regression was performed to ascertain relationships between having been tested and student characteristics found to have associations with PAP testing of $p \leq 0.15$ in univariate analysis, controlling for grade and school, and incorporating a grade by school interaction term.

TABLE I

Characteristics and Contraceptive Behaviours of Young Women Who Were Sexually Active for at Least One Year and Who Had Seen a Physician in the Previous Year, by Grade* (N=396)

Characteristics	Grade 10 (n=99) %	Grade 11 (n=133) %	Grade 12 (n=164) %	p-value
Father ≤ High School	46.8	45.0	43.3	0.859
Mother ≤ High School	44.7	45.7	48.8	0.784
Father Employed F/T†	91.0	84.7	85.6	0.373
Mother Employed F/T	64.5	66.2	63.4	0.882
See Family as Advantaged	34.3	27.8	32.3	0.534
Living With Both Parents	51.0	48.1	62.8	0.027
Living in a Major Town	59.2	66.2	64.4	0.535
Grade Past Year <80%‡	73.7	72.9	59.1	0.013
Hormonal Contraception‡	59.6	76.2	81.7	<0.0001
Condom Only‡	26.3	18.2	10.4	0.004
No Effective Method‡	14.1	6.7	7.9	0.126

* All questions except father's employment had at least 387 respondents (98%). Father's employment had 351 (89%).
† F/T = full time.
‡ At last intercourse.

RESULTS

One thousand and ninety female students aged 15 to 19 and in grades 10 to 12 completed surveys, with a response rate of 91% among those present the day of the survey. Their average age was 16.6 (SD 0.1). Five hundred and forty-seven (50.1%) had had vaginal intercourse at least once, and 246 (45.0%) of these reported having had a PAP test in the previous year. PAP testing was no different between grades 10 and 11 (39.5 % and 38.2% respectively), though it was significantly higher in grade 12 students (56.5%; p<0.0001). Of 438 young women who had been sexually active for at least one year (who according to Nova Scotia guidelines required PAP testing), 51% had had a PAP test.

Of the young women, 396 had been sexually active for at least one year and had also visited their family physician or another physician at least once during that year; 393 of these women answered the question about PAP screening. Of these, 54.5% had been tested. With respect to their overall contraceptive behaviours, 62.7% had used oral contraception, 48.4% condom, 11.6% injection, 4.5% withdrawal, 1.3% foam, 0.3% IUD or sponge and 0% diaphragm. When these were classified into use of hormonal contraception (with or without other method), condom only, and no effective contraception, proportions using these were 74.3%, 17.0% and 9.1% respectively.

Table I shows characteristics and contraceptive behaviours of the 396 young women by grade. Significant differences in characteristics of respondents by grade were seen in average school grade and proportion living with both parents. With respect to contraceptive behaviours, use of hormonal contraception increased with grade, while use of condoms alone decreased.

Table II shows proportions of sexually active women who had had a PAP test in

TABLE II

Proportions of Young Women Who Had a PAP Test in the Previous Year, by Personal Characteristics and Behaviours (N=393)*

Characteristic		Number Responding	% with PAP Test	p-value
Grade	10	99	46.5	0.007
	11	131	48.9	
	12	163	63.8	
Mother	≤ High School	180	52.2	0.229
	> High School	204	58.3	
Father	≤ High School	173	53.2	0.414
	> High School	211	57.3	
Mother	Employed F/T	248	55.6	0.518
	Not Employed or < F/T	136	52.2	
Father	Employed F/T	303	54.1	0.670
	Not Employed or < F/T	47	57.4	
See Family as Advantaged	(Yes)	124	64.5	0.007
	(No)	269	49.8	
Living With Both Parents	(Yes)	215	51.6	0.235
	(No)	177	57.6	
Living In:	Major Town	250	58.4	0.038
	County Area	141	47.5	
Grade in Past Year:	<80%	264	55.3	0.628
	≥80%	129	52.7	
Hormonal Contraception†	(Yes)	292	62.5	<0.0001
	(No)	100	32.0	
Condom Only†	(Yes)	65	26.2	<0.0001
	(No)	327	60.2	
No Effective Method†	(Yes)	36	41.7	0.102
	(No)	356	55.9	

* Who were sexually active for at least one year and had seen a physician in the previous year.
† At last intercourse.

TABLE III

Factors Identified by Stepwise Logistic Regression as Being Associated Independently with Having a PAP Test in the Previous Year (N=390)*

Variable	Odds Ratio (95% CI)	p-value
See Family as Advantaged	2.25 (1.37-3.69)	0.001
Living in Major Town	1.89 (1.13-3.18)	0.016
Contraception Type (Hormonal is Reference)		
Condom only†	0.20 (0.11-0.38)	<0.0001
No effective method†	0.36 (0.17-0.78)	0.010

* Controlling for grade and school, and grade-school interaction
† At last intercourse

the previous year, by personal characteristics and contraceptive behaviours. Characteristics associated with PAP testing were viewing family as advantaged (p=0.007) and living in a town as opposed to more rural area. Using hormonal contraception at last intercourse was positively associated with testing (p<0.0001) while using a condom alone was negatively associated (p<0.0001).

Table III shows the results of forward stepwise logistic regression, using as independent variables those factors associated with PAP testing at the 0.15 level or lower, and controlling for grade and school. To control for intraclass correlations by grade within school, a grade by school interaction term was entered. The model was a good fit, with the Hosmer Lemeshow test having a p-value of 0.263. All tolerance values were >0.86, indicating that multicollinearity was not a problem. In the final model, four variables were significantly associated with PAP testing. Use of condom only and no effective contraception at last intercourse (as compared to using hormonal contraception) were negatively associated with having received a PAP test, while seeing one's family as advantaged and living in a major town were positively associated.

DISCUSSION

Fifty percent of young women aged 15 to 19 in this study were sexually active and 45% of these respondents indicated having a PAP test in the previous year. This is approximately what should have been expected, since of the overall population of such young women in Nova Scotia – of whom about half also are sexually active[5] – about 25% have PAP testing annually.[1] Thus, we can be assured that in this respect, our sample resembles the province overall.

We found that PAP testing among sexually active young women who had seen a physician in the past year was associated with young women's perception that their family was relatively better off than others. Other work in Nova Scotia has shown that among women aged 18-74, living in a low income Enumeration Area is associated with decreased PAP testing.[9] Canadian studies showing associations of lower socio-economic status with decreased PAP testing have mainly involved research on ethnic group.[15-17] Our results, which apply to a largely Caucasian population,[18] indicate that these associations may begin quite early on in the reproductive health experience of young women. We also saw that young women living in the towns which are the county seats for the three counties involved in the study were more likely to have had a PAP test. This may represent better access to services, and is also in keeping with previous work in older women in Nova Scotia in terms of PAP testing prevalence estimates.[9]

Not using hormonal contraception at last intercourse was negatively associated with PAP testing, even though all young women examined in this study both required a PAP test and had seen a primary care physician in the previous year. While other interpretations may apply here (for example, refusal of testing if offered), the strong negative association of using other than hormonal contraception with PAP testing suggests that physicians are using requests for hormonal contraception as cues for carrying out this recommended procedure. Only 43% of a national sample of Grade 11 students reported using oral contraception,[3] a figure similar to the 50% we have reported in Nova Scotia women in Grades 10 to 12, where we also demonstrated that about 5% of young women were using injection methods[19] – slightly fewer than the 11.6% reported here. Relatively low levels of hormonal contraception by adolescents, combined with its use as a physician cue for providing PAP tests, might partially explain the observed low levels of adolescent PAP testing. Physicians often do not take sexual histories,[20,21] and Nova Scotia physicians report not often asking adolescents about sexual practices.[22] Efforts to increase PAP testing

in adolescents should include professional development to increase recognition of sexual activity in young women.

Despite the fact that screening occurred much more often in association with use of hormonal contraception, it should also be recognized that a large number (37.5%) of women aged 15-19 using such contraception were not screened. Efforts clearly need to be made to increase testing in young women who use hormonal contraception as well as those who do not.

This study has several limitations. Its cross-sectional nature establishes associations, but limits the ability to infer causality. In addition, though the study involved a large area of Nova Scotia and students represented about 40% of their age group in all three counties, the rural nature of this population limits the study's generalizability; each county has a population of approximately 50,000, and each of the county seats has approximately 10,000 citizens. Less than 2% of the population represents visible minorities, compared with the 3.5% seen in the province overall, and average education and income levels are at slightly less than provincial levels. The data are self-reported, and rely on the willingness of participants to provide truthful, accurate information. The sample size and high participation rate do provide assurance that the results represent the study areas, and probably are an indication that similar findings would be seen in other rural areas of the province. We believe that these findings represent an important contribution to understanding what limits PAP testing in younger women.

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RÉSUMÉ

Objectif : Déterminer les liens entre les facteurs socioéconomiques et les schémas de contraception, d'une part, et le dépistage cytologique du cancer du col (test de Papanicolaou), d'autre part, chez les adolescentes sexuellement actives de 15 à 19 ans ayant consulté un médecin dans le Nord de la Nouvelle-Écosse au cours de l'année précédente.

Méthode : Des élèves de quatre écoles secondaires situées dans trois comtés du Nord de la Nouvelle-Écosse ont répondu à un questionnaire transversal. Les questions portaient sur les schémas de contraception, le statut socioéconomique et l'utilisation des services de santé, y compris le dépistage du cancer du col. Nous avons examiné les liens des facteurs socioéconomiques et des schémas de contraception avec le fait d'avoir subi un test de dépistage du cancer du col au cours de l'année précédente chez les adolescentes sexuellement actives depuis au moins un an et qui avaient aussi consulté un médecin pendant l'année précédente.

Résultats : Mille quatre-vingt-dix (1 090) adolescentes de 15 à 19 ans ont rempli des questionnaires, soit un taux de réponse de 91 %. Sur les 396 répondantes ayant dit être sexuellement actives et avoir consulté un médecin au cours de l'année précédente (36,3 %), 393 ont fourni de l'information sur le dépistage du cancer du col. Parmi elles, 214 (54,5 %) ont déclaré avoir subi un test de dépistage du cancer du col. Les facteurs associés à ce test étaient le fait de se considérer comme faisant partie d'une famille aisée et le fait de vivre dans une grande ville plutôt que dans une région rurale. Par opposition à la contraception hormonale, l'utilisation d'un condom sans autre moyen contraceptif efficace ou l'absence de tout moyen contraceptif efficace lors de la dernière relation sexuelle avec pénétration étaient négativement associées au dépistage du cancer du col.

Conclusions : Ces constatations donnent à penser que les médecins se basent sur la contraception hormonale pour administrer le test de dépistage du cancer du col aux adolescentes. Or, le dépistage périodique du cancer du col est recommandé pour toutes les adolescentes sexuellement actives; les efforts pour accroître ce type de dépistage devraient prévoir des mesures de perfectionnement professionnel pour permettre aux médecins de reconnaître plus facilement l'activité sexuelle chez les adolescentes.