A B S T R A C T

Purpose: In the context of a community development project related to adolescent sexual health, this study was carried out at Amherst Regional High School (ARHS) in Amherst, Nova Scotia, to assess students’ sexual health knowledge, gender differences in knowledge, and associations between knowledge and sexual behaviours.

Methods: A 29-item scale assessed knowledge in five areas of sexual health. Gender differences in correct responses to questions were compared. Overall knowledge scores were compared by gender, grade, and sexual activity, and tested for association with sexual behaviours.

Results: Of 796 students, 80% participated. Sexual health knowledge scores were highest for sexually active females. Higher score was associated with oral contraceptive use and later sexual debut. Knowledge was highest for HIV/AIDS. Students were insufficiently aware of their right to patient confidentiality.

Conclusion: ARHS students lack knowledge in some sexual health areas. School programs should consider these findings, and work to improve school-based sexual health education.

A B R É G É

Objectif : Cette étude a été réalisée à l’école secondaire régionale d’Amherst, en Nouvelle-Écosse, dans le cadre d’un projet de développement communautaire concernant la santé sexuelle des adolescents, afin d’évaluer les connaissances des étudiants en matière de santé sexuelle, les différences dans les connaissances entre les deux sexes, et les associations entre les connaissances et les comportements sexuels.

Méthodes : Une échelle comprenant 29 critères a permis d’évaluer les connaissances dans cinq domaines de la santé sexuelle. On a comparé les réponses correctes aux questions des garçons et des filles. Les résultats d’ensemble ont été comparés selon le sexe, l’année d’étude et l’activité sexuelle, en plus de les évaluer par rapport aux comportements sexuels.

Résultats : Sur 796 étudiants, le taux de participation a été de 80 %. Pour ce qui est des connaissances de la santé sexuelle, les filles sexuellement actives ont eu les résultats les plus élevés. On a constaté une association entre les résultats élevés et l’utilisation d’un contraceptif oral ainsi qu’une initiation sexuelle plus tardive. Les résultats ont été les plus élevés s’agissant des connaissances relatives au VIH et au sida. Il est apparu que les étudiants n’étaient pas suffisamment au courant de leurs droits en matière de confidentialité du patient.

Conclusion : Les étudiants de l’école d’Amherst manquent de connaissances dans certains domaines de la santé sexuelle. Les programmes scolaires devraient prendre en compte ces résultats et s’efforcer d’améliorer l’éducation sexuelle faite dans les écoles.

Sexual Health Knowledge of Students at a High School in Nova Scotia

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Canadian and Nova Scotian adolescents are sexually active,1,3 with more than 60% of Nova Scotia grade 12 students having had intercourse.4 Sexually transmitted disease (STD) occurs most frequently in those aged 15-24,1 and 4 to 5% of Nova Scotia women aged 15-19 become pregnant annually.4,5

The relationship of knowledge to sexual behaviours is complex.6 Imparting facts can increase knowledge, but has inconclusive effects on behaviour.7 Knowledge appears necessary to, but insufficient for, informed sexual behaviour.8,9 Attitudes, intentions, and perceptions of social norms are also important.10

In the context of a community sexual health initiative, we surveyed adolescents aged 13-19 attending Amherst Regional High School (ARHS) in Amherst, Nova Scotia, a community of 9,700, similar to other communities in the province.11 Many Amherst adolescents are sexually active, and many engage in high-risk sex.3 Students receive sexuality education in two programs: “Personal Development and Relationships”, compulsory in grades 7-9, and “Family Studies”, compulsory in grades 7-8/elective in grades 9-12. In these programs, topics are taught somewhat in isolation, and sensitive issues may be taught sporadically.12

METHODS

Students completed questionnaires in classroom settings in November 1996. Questions included inquiry about sexual health knowledge, attitudes and behaviours. A 29-item scale gave the options “true”, “false”, or “don’t know” to knowledge questions in five areas: general knowledge, oral contraception, condom use, chlamydia, and HIV/AIDS. A score of one was assigned for correct and zero for incorrect answers, or where answers were not known. The scale was internally consistent (alpha=0.77).

Chi-squared tests were performed to detect gender differences in responses to questions. Mean scores were calculated for each gender and grade by sexual activity. Results were weighted for non-response.

To determine associations between knowledge and six sexual behaviours, regression techniques were used. Sexual behaviours examined included having more than one partner in the previous year, anal sex, condom use for last, and all of last three, episodes of vaginal intercourse, use of oral contraception (OCP) at last vaginal intercourse (females), and age at first vaginal intercourse. Age, gender, average school mark, residence, father’s education (university/other), religiosity (church attendance once/week), and total knowledge score were entered into a logistic model as independent variables to examine associations with the first five behaviours. (To assess females’ condom use, OCP at last intercourse was entered.) To determine associations between age at

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first intercourse and knowledge, linear regression was performed.

**RESULTS**

**Overall response**

Of 811 students, 6 were refused parental permission, and 9 were judged incapable of consenting. Of the 796 remaining, 640 (80%) participated. Two hundred and ninety-five (46%) were male, 345 female. One hundred and eighty (28%) were from grade 9, 164 (26%) grade 10, 164 (26%) grade 11 and 132 (21%) grade 12. The mean age of males was 16.0 (s.d. 1.6) and of females 15.7 (s.d. 1.6). Seventy-five percent were from Amherst, 21% the county and 4% another community.

**Sexual activity**

Overall, 55% had experienced vaginal intercourse, and 11% anal sex. Mean age at first vaginal intercourse was 14.8 (s.d. 1.6) for males and 14.7 (s.d. 1.4) for females.

**Sexual health knowledge**

**General (Table I)**

Most students (85%) knew about financial hardship for teenage mothers, but only 39% about health problems among their babies. Only 36% knew that fewer than half of Amherst’s adolescents have intercourse before age 14, and slightly more than 50% that fertility is highest at mid-cycle.

**HIV/AIDS (Table II)**

At least 80% knew that unsafe sex with an infected person can result in transmission, that appearance is no indication of HIV status and that HIV can be present for long periods before AIDS develops. Most (78%) knew condoms provide HIV protection.

**Contraception (Table III)**

Most (79%) knew pregnancy can occur with missed pills, and 94% that OCPs provide no STD protection. Only 43% knew parents’ permission is not required for physician OCP prescription to women younger than 18.
**Condoms (Table IV)**

Almost all (95%) realized knowing partners’ lifestyle/sexual history does not obviate condom use, 85% that condoms can prevent STDs, and 94% that condoms are not just for casual sex. Only 66% knew Vaseline is a poor lubricant to use.

**Chlamydia (Table V)**

Fewer than 50% knew chlamydia can be asymptomatic and only 51% recognized female infertility as a complication. Only 27% recognized chlamydia as common in those aged 15-19 and 42% that physicians are not obliged to report chlamydia to parents.

In general, females demonstrated better knowledge. Males better understood actual condom use, while females knew more about circumstances in which to use condoms.

### Overall sexual health knowledge

Mean knowledge score (genders combined) was 19.5. Females (sexually active and non-sexually active combined) had higher scores than males (20.3 vs. 19.0, p<0.0001). Mean scores for sexually active students (genders combined) were higher than for non-sexually active students (20.2 vs. 18.8, p<0.0001, Table VI). For males, mean score differences between the sexually active and non-sexually active were not sig-
significant (19.0 vs. 18.3, p=0.207); differences between sexually active and non-sexually active females were significant (21.2 vs. 19.2, p<0.0001).

Gains in knowledge with grade were modest. Grade 12 males (sexually active and non-sexually active combined) scored 1.3 points higher than grade 9 males (p=0.097); grade 12 females scored 3.1 points higher than grade 9 females (p<0.0001). (Data not shown.)

**DISCUSSION**

Many ARHS students were unaware of important aspects of sexual health. Only 63% of females knew that pregnancy is most likely at mid-cycle, and 17% believed that pregnancy cannot occur at first intercourse. Students overestimated peers' sexual activity, with 64% incorrectly believing that more than half of 14-year-olds have had intercourse. In adolescence, the peer group powerfully influences behaviour,

### TABLE V

**Students' Responses to Knowledge Items Related to Chlamydia Infection, by Gender**

<table>
<thead>
<tr>
<th>Knowledge Statement</th>
<th>Gender</th>
<th>Correct (%)</th>
<th>Incorrect (%)</th>
<th>N</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guys with chlamydia always have symptoms. (False)</td>
<td>Male</td>
<td>39.0</td>
<td>61.0</td>
<td>289</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>53.1</td>
<td>46.9</td>
<td>343</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>46.2</td>
<td>53.8</td>
<td>632</td>
<td></td>
</tr>
<tr>
<td>Girls with chlamydia always have symptoms. (False)</td>
<td>Male</td>
<td>33.8</td>
<td>66.2</td>
<td>290</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>45.8</td>
<td>54.2</td>
<td>342</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>39.9</td>
<td>60.1</td>
<td>632</td>
<td></td>
</tr>
<tr>
<td>Chlamydia infection in women can result in being unable to have children (infertility). (True)</td>
<td>Male</td>
<td>42.3</td>
<td>57.7</td>
<td>288</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>59.6</td>
<td>40.4</td>
<td>341</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>51.2</td>
<td>48.8</td>
<td>629</td>
<td></td>
</tr>
<tr>
<td>Chlamydia is common among people aged 15 to 19. (True)</td>
<td>Male</td>
<td>22.9</td>
<td>77.1</td>
<td>289</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>30.9</td>
<td>69.1</td>
<td>341</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>27.0</td>
<td>73.0</td>
<td>630</td>
<td></td>
</tr>
<tr>
<td>A family doctor must tell the parent(s) if a guy or girl less than 18 years old has a sexually transmitted disease (STD). (False)</td>
<td>Male</td>
<td>39.7</td>
<td>60.2</td>
<td>289</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>43.4</td>
<td>56.6</td>
<td>341</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>42.1</td>
<td>58.4</td>
<td>630</td>
<td></td>
</tr>
<tr>
<td>If a guy or girl aged 15 to 19 gets chlamydia and it is treated properly, he or she can never get chlamydia again. (False)</td>
<td>Male</td>
<td>50.9</td>
<td>49.1</td>
<td>287</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>65.5</td>
<td>34.5</td>
<td>340</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>58.4</td>
<td>41.6</td>
<td>627</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE VI

**Mean Knowledge Scores (SD) for Students Who Ever Had, and Who Have Never Had, Vaginal Sex, by Grade and Gender (Maximum Score 29)**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Grade</th>
<th>Mean Score (SD) Students Who Have Had Vaginal Sex</th>
<th>Number Responding</th>
<th>Mean Score (SD) Students Who Have Not Had Vaginal Sex</th>
<th>Number Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Students Who Have Had Vaginal Sex</td>
<td></td>
<td>Students Who Have Not Had Vaginal Sex</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean Score (SD)</td>
<td>Number Responding</td>
<td>Mean Score (SD)</td>
<td>Number Responding</td>
</tr>
<tr>
<td>Male</td>
<td>9</td>
<td>17.8 (4.4)</td>
<td>25</td>
<td>18.0 (4.6)</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>18.2 (4.7)</td>
<td>21</td>
<td>17.9 (5.3)</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>19.4 (4.0)</td>
<td>43</td>
<td>18.9 (4.5)</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>19.4 (4.2)</td>
<td>45</td>
<td>18.5 (3.5)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>19.0 (4.3)</td>
<td>134</td>
<td>18.3 (4.7)</td>
<td>126</td>
</tr>
<tr>
<td>Female</td>
<td>9</td>
<td>20.5 (4.1)</td>
<td>23</td>
<td>18.4 (4.9)</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>19.8 (3.8)</td>
<td>41</td>
<td>19.4 (4.0)</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>21.1 (3.2)</td>
<td>54</td>
<td>20.1 (3.2)</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>22.5 (3.7)</td>
<td>51</td>
<td>20.3 (4.0)</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>21.2 (3.7)</td>
<td>169</td>
<td>19.2 (4.4)</td>
<td>161</td>
</tr>
<tr>
<td>Total Both Genders</td>
<td></td>
<td>20.2 (4.2)</td>
<td>303</td>
<td>18.8 (4.5)</td>
<td>287</td>
</tr>
</tbody>
</table>

for six response variables. Higher score was marginally significant within the logistic model for OCP at last intercourse (p=0.0827) and significant within the linear model for older age at first intercourse (=0.058, p=0.0067).

Other variables were also significantly associated with behaviours. Males were more likely than females to use condoms for last, and last three, episodes of intercourse (p<0.01). For females, oral contraception at last intercourse was also associated with increased condom use for last, and last three, episodes of intercourse (p<0.05). A weak association was seen between higher school mark and condom use at last intercourse (p=0.0878).
and sexual behaviour is influenced by that of close friends. Social normative beliefs may be more important than behaviour itself.

While knowledgeable about HIV/AIDS, students know less about chlamydia, which can have important implications, including infertility. Fewer than half knew that chlamydia can be asymptomatic, and only 27% that it is common in adolescents. Lack of knowledge of chlamydia has been seen in Australian and Norwegian adolescents, and should be addressed by educational programs.

Most students were knowledgeable about contraception. However, 44% of females were unaware that physicians do not require parents’ permission to prescribe OCPs. Confidentiality is a concern for adolescents, and physicians are major sources of their sexual health services. Students should know of their right to have no one made aware of their interactions with physicians.

Gender differences in knowledge are consistent with other studies; females were more knowledgeable than males, except for specifics of condom use, a finding also seen in California. If young men are to take responsibility for sexual health, educational programs, and other providers of information, including parents, physicians and family planning clinics, must provide them with appropriate information.

Relationships between knowledge and use of contraception have not been conclusively demonstrated in other studies, though in this study higher knowledge scores were associated with more use of OCPs at last intercourse. Perhaps having more knowledge does lead young women to obtain OCPs. However, they could also receive information while being provided contraception. Longitudinal data is required to assess this finding.

A notable finding was the association of increasing age of first intercourse with increased knowledge. For every unit change in total score, 0.058 years were added to age of first intercourse. Students scoring 6 points higher than others would add four months to their sexual debut. This finding is consistent with other work and supports early sexual health education.

This study has limitations. Observations are cross-sectional, and differences in knowledge over time may be greater, or less, than measured. Twenty percent of students did not participate, either because they were not present, or because they chose not to complete, or hand in, surveys. If these individuals are significantly different from respondents, results will not be representative; however, we have no reason to believe that major differences exist between respondents and non-respondents. Finally, it should be remembered that these findings are from one school only, and may not be generalizable, even within Nova Scotia.

REFERENCES


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